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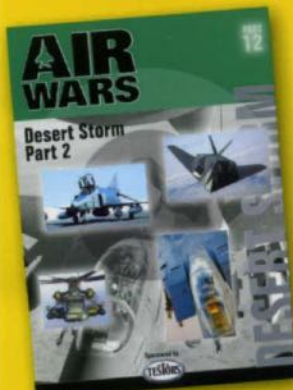
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Media House, 21 Kingsway, Bedford MK42 9BJ
Telephone: +44 (0) 8707 333373
Fax: +44 (0) 1234 261251
Email: mail@sampublications.com

PUBLISHER SAM Limited

GROUP EDITOR Neil Robinson
Media House, 21 Kingsway, Bedford MK42 9BJ
Email: neil@sampublications.com

EDITORS PA Jill Robinson

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ART DIRECTOR Simon Sugarhood**EDITORIAL CONSULTANT** Paul Lucas**ILLUSTRATORS** Jon Freeman, Peter Scott**SAM LIMITED EMAIL**

mail@sampublications.com

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ADVERTISING DIRECTOR Joanna Brooks

ADVERTISING SALES +44 (0) 1234 761441

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Space, the final frontier..

In this instance, 'space' is the terrestrial space in which we keep all the paraphernalia of our hobby!

As I have mentioned in previous editorials, I, like many of the readers of modelling magazines, have got more models stashed away than I'm ever going to build in several life times, never mind the one I have been allocated, but I still go on buying new ones. If I average building twelve models a year, I consider it to be a good year, but that doesn't necessarily equate to one model a month as I tend to build in 'batches', to a specific or general theme, and at the end of any particular building 'batch', which normally lasts several weeks, I might have three or more models finished, with the next 'batch/theme' not seeing the light of a display table for a couple of months, or three, later.

I have never been able to explain nor justify to my wife, (She Who Must Be Obeyed), why I 'need' to buy more kits when I have got a loft FULL of them; I just

say it is a 'man thing' and tell her that when I eventually *shuffle off my mortal coil*, she can sell them all and go on the world cruise I had always promised her for a distant 'milestone' wedding anniversary present! (I'm sure she'll have more fun with a new 'toy boy' than me anyway!)

The 'problem' is, what SWMBO doesn't understand, is my primal fear that if you don't buy that new kit when it is released, whether you actually intend to build it straight away or not, it is Murphy's Law that it will not be available when you DO



decide you might want to build it – in three months or three years time, so, it seems to me, to quote our beloved Prime Minister, that it's prudent to buy it NOW! Perfectly logical...

In fact I'm suffering from such a lack of 'retail determination' at the moment, as I have been searching for a 1/48 scale Ta 152H-1 kit for weeks, to complete my late-war Fw 190 series collection, and am kicking myself for not buying the Italeri boxing of the Dragon kit when it was available a few years ago. *Doh!*

However, where this 'buy it now/repent at leisure' logic tends to break down somewhat, is that manufacturers are releasing kits faster than I can build 'em, and it's odds-on that I will

NEVER actually get around to building anything but a small fraction of the kits I buy – *but don't tell my wife that!*

The thing is, and this is what she cannot get her head around, is that I don't know what I might want to build in six months time so I have to be prepared for any eventuality and buy everything! Simple, eh?

The same theory/logic/obsession, call it what you will, applies to aftermarket decal sheets and resin accessories. I know and accept that I'm luckier than most modellers, as working for a publishing company like SAM Ltd, we get a fair proportion of aftermarket decal sheets and resin accessories 'for free', in



In this issue, 'Air Wars', the 16-page colour schemes and markings supplement. Sponsored by



Part 12:
Operation Desert Storm
Part 2

Next Month

Part 13: Operation Desert Storm – Part 3 – US Navy and Marines

ples and my own personal purchases, my book collection is rapidly outgrowing my bookshelf space.

When we first moved in to the house we live in now, I had custom-made book cases built into the walls of one of the upstairs bedrooms that I had originally sequestered as my model room and into a small downstairs room that I euphemistically call 'my study'.

They were filled almost immediately, then, after my grandson was born, I was told (by SWMBO) he needed his own room at Nannan and Grandad's in case he ever came to stay overnight – stay overnight, he's 14yrs old now and never away from our house... bless him. And he eats too much...

Anyway I digress. Having been forcibly evicted from the bedroom, (although the book shelves are still there, waiting for him to grow too old to stay at Nannan and Grandad's, which is when I get to reclaim the bedroom back... maybe?), I did a similar exercise, when we converted our detached garage into 'my office' with separate adjoining model room, from where I am writing this, incidentally. Those shelves were filled within a year or so, and I was reduced to buying commercial book cases, (oh the ignomy!), and screwing them to any available free wall space I could find in garage/office/model room or the house!

As fast as IKEA produce bookcases I buy 'em and fill 'em with my books – at

And finally...

I am very pleased to announce and welcome Andy Evans onto 'MAM's editorial team as Assistant Editor. Andy is also currently editing one of SAM Ltd's sister publications, 'Scale Models International', but he has now got the production of that title down to a fine art, so that it is less demanding of his valuable time, which has allowed him the opportunity to author several of our latest 'Modellers Data File' books, with several more in the pipeline.

Following my 'ticker trouble' in April 2006, I have been advised by the medicos to start taking it a little bit easier, (and take more exercise, *ugh!*), and so, He Who Must Be Obeyed, (my boss, SAM Limited's publisher, Steve Elliott), kindly suggested that Andy might like to further organise his time to help me out on the production of 'MAM' too, to give me the odd afternoon off to do some walking exercise with my dogs!

I don't want you to get the impression that I will be disappearing 'from the scene', far from it. We have many new projects in the pipeline, but Andy will be able to provide some much appreciated help in the grinding monthly magazine publication treadmill and perhaps allow me a little more time to search out and commission more historical/reference articles, that seem to be so popular with 'MAM's readership, and to do a little more research and modelling of my own!

Gaining Andy's knowledge and experience on the team will certainly enhance and improve 'MAM' even further, and having another 'total enthusiast' to work closely with on the title, especially one that I get on so well with, (we're also good friends in 'real life' as well as work colleagues, and in fact first worked together on a publication in the early 1980s – which only seems like yesterday to both of us!), can only bode well for the magazine for

"...as my modelling skills diminish even further, at least I will still be able to look at and read my books..."

the form of review samples – but I do still buy a considerable amount for myself. The point I'm trying to make is that despite my best intentions to actually use all the decals and accessories I buy, or manage to prise out of my fellow editors' hands, I still end up using only a relatively small proportion of them, the rest being carefully allocated to my 'spares' boxes, which, together with my unmade kits is literally taking up 99% of the entire space of the loft – which resulted in me having the same old annual problem of cramming the Christmas decorations into a small dark corner when they were taken down at the beginning of this year!

Of course, that now brings us to reference books – my pride and joy. If I ever *had* to make the unthinkable, heart-rendering decision to choose between keeping my models/modelling paraphernalia or my books, there could be no real competition, I would, albeit very reluctantly, have to decide to keep the BOOKS.

Books are forever. As I hurtle, ever faster it seems, into my dotage, and as my modelling skills start to diminish, (... even further!), through failing eyesight and lack of hand-to-eye coordination, at least I will still be able to look at and read my books. However, they are starting to take over the house now – literally! What with the gratefully received review sam-



least that is how it seems. I could do with borrowing Time Lord technology and have a room like Dr Who's TARDIS!

However, when I do eventually *snuff it*, (not for some years yet, I hope!), I do rather fancy the idea of having a Viking-style funeral – being laid to rest in a longboat, surrounded by boxes of all my unmade kits, decals and accessories, and my beloved books, and then being pushed out to sea whilst a regiment of IPMS archers fire flaming arrows into the boat – *what a send off that would be!*

the future. *The only thing is he's taller than me, (who isn't!), but I've got more hair, (only just!)... MAM*

Neil Robinson
Group Editor
Model Aircraft Monthly





A pair of Rocs from 759 NAS at Eastleigh during late 1940. The nearest Roc, L3118/O has A Type roundels above its wings which are either the original roundels applied during production which have been retained after the aircraft was camouflaged or have been added as a result of an RAF Coastal Command order in force between November 1939 and June 1940 which stated that all RAF maritime reconnaissance aircraft should wear these roundels above their wings after an Anson was almost shot down accidentally by Spitfires. Note that the cowlings on the furthest Roc retain the high underside demarcation line so can either be from another aircraft or were removed when this aircraft was repainted and the underside of the left wing is still finished in black with a yellow ring around its roundel, so the right wing should be white (via Ian Gazeley)

The Navy's Turret Fighter –

The Blackburn Roc

Tony O'Toole describes the introduction of the FAA's first turret fighter into service and models a pair of the recently released 1/48 scale Special Hobby Rocs in very different colour schemes...

During the 1930s new all-metal mono-planes with ever more powerful engines were being introduced which were so much faster than their biplane predecessors, and this rapid development continued at a startling rate due to rising political tension in Europe.

Some experts began to claim that conventionally armed fighters with the standard twin forward firing machine guns of the day would be unable to shoot down these newly developed aircraft as they were so fast that sufficient damage could not be inflicted within the fleeting moment they would appear in the gunsight. Because of these increased speeds and the fact that the new mono-planes were less manoeuvrable than traditional biplanes, many observers also considered that dog fighting was now a thing of the past and answers were urgently sought for the future of air-to-air combat.

In Britain there were two separate approaches to dealing with this perceived problem. One answer was to simply increase the size of a fighter's forward firing armament from two to eight machine guns so that more damage could be inflicted within the short space it took the faster target to pass through the gunsight. The other answer was to ensure that the target stayed within the gunsight for a longer period of time so that more damage could be inflicted by tracking it using machine guns mounted inside one of the

newly developed power operated turrets. This turret would be mounted in a two-seater fighter and such a method also had the added advantage of not having to aim the entire aircraft at the target, thus making interceptions supposedly simpler now that dogfighting was deemed impossible!

The Royal Air Force keenly embraced both of these ideas and of course the eight-gun approach resulted in the Spitfire and Hurricane, but many of 'Their Airships' who led the RAF from the Air Ministry in Whitehall were more in favour of the turret fighter concept. This may be because it harked back to the days of the Great War when most of these senior officers had been young pilots of

two-seater fighters such as the Sopwith Strutter and Bristol Fighter, armed with forward and rear facing guns, which had been a great success once the right tactics had been worked out. However times and tactics had changed since then and to compound matters further a fatally misguided decision was taken NOT to equip any future two-seat turret fighter with forward firing guns as it was thought that they might prove too tempting for the pilot to use and thereby lead him astray from his main task of positioning the aircraft for his turret gunner!

Despite the success of the eight-gun fighters, the RAF was still extremely enthusiastic about the turret fighter concept too, which they thought of as an ideal 'Bomber Destroyer' and the Merlin engined Boulton Paul Defiant was ordered to fulfil its requirements, armed with four 0.303 inch Browning machine guns within a Boulton Paul power-operated turret, but this would not be the only turret fighter to be ordered by the Air Ministry!

Towards the end of World War One, on 1 April 1918, the Royal Naval Air Service (RNAS) and the Royal Flying Corps (RFC) were combined to form the newly created Royal Air Force and as a result of this the new service took over responsibility for the procurement and operation of all naval aircraft, for which they formed the Fleet Air Arm of the Royal Air Force. Due to inter-war underfunding this became something of a Cinderella service and



This Roc, L3089 was used for cine camera trials on floats at the Marine Aircraft Experimental Establishment at Helensburgh and also on wheels at the Aircraft and Armament Experimental Establishment at Boscombe Down. Note that it has a lightweight cupola fitted instead of a turret and the cabin between this and the pilots cockpit is fixed with much bigger windows, which are square instead of triangular



Future Fleet Air Arm ace Stan Orr stood beside an overall silver Blackburn Roc, probably during his fighter pilot training at Eastleigh with 759 NAS (via Brian Cull)

was treated as a low priority for new equipment by the RAF, but in their enthusiasm for the new turret fighter concept the Air Ministry decided that an aircraft of this type should also fly from the decks of Royal Navy aircraft carriers, so on 31 December 1935 specification 0.30./35 was issued for a carrier capable turret fighter.

To meet this specification, the Blackburn Aircraft Company at Brough in Yorkshire decided to modify the design of their Skua naval fighter/dive bomber by widening its fuselage to accept a four-gun turret which was almost identical to that used in the Defiant, and by giving the wings two degrees of dihedral they also overcame the stability problems that had initially dogged the Skua until its wingtips had been upturned. Apart from this increase in dihedral the wings of the new aircraft remained almost identical to those of the Skua with the same effective dive flaps, and many other aspects of this airframe remained giving the new fighter an equally phenomenal diving capability.

On 10 July 1937, Blackburn received an order to build 136 of their new naval turret fighters straight from the drawing board, and under the system of naming naval fighters after birds it was

given the slightly ironic name Roc, as this was a bird from Arabian legend of phenomenal size and power; well, one out of two cannot be bad!

Unlike the Defiant, which was to be employed in squadron strength, the Blackburn Roc was only ever intended to form part of a squadron, as under the Fleet Air Arm system in place at the time, their fighter units contained a mix of types. Currently filling the role was the two-seat Hawker Osprey

"...Blackburn modified the design of the Skua by widening its fuselage to accept a four-gun turret..."

which was armed with forward and rear mounted guns and the single-seat Hawker Nimrod with forward mounted armament – both biplanes of very similar design.

Because the Skua and Roc were also extremely similar in design and had many spare parts in common, this must have played a large part in the decision to procure the Roc, however many senior officers in the Admiralty were very unsure about the turret fighter concept, especially the 5th Sea Lord, who was head of naval aviation matters. Ever since the end of World War One the Admiral-

ty had been trying to regain control of naval aviation and thanks to the Inskip Award of 1937, (which did not actually come into full effect until 24 May 1939), they finally succeeded, and one of the first things they did was to order a more conventional replacement for the Roc in the form of the Fairey Fulmar, whilst Gloster Gladiator biplanes were swiftly procured in the meantime to act as a stop gap measure and were converted for carrier use as the Sea Gladiator, so confidence in the Roc was not exactly high!

Although Blackburn had won the new naval turret fighter contract, their factory, at Brough near Hull, was too busy to actually build the Roc because it was in full swing catching up with the late delivery of the Skua, and was also tooling up ready to build the Botha twin-engined patrol bomber for the RAF, so the work was instead contracted out to Boulton Paul at Pendeford near Wolverhampton. They were the manufacturers of the Roc's Type A Mk IIR gun turret and were themselves preparing to set up a production line for the RAF's Defiant turret fighter which was armed with the almost identical Type A Mk IID turret, so their factory had to be increased in size to cope. This meant that both types of turret fighter would eventually be built side-by-side under the same roof, although the Roc actually went into production first.

However, this nearly did not occur because after winning back control of its air arm following the Inskip Award, the Admiralty tried to cancel the Roc before production got underway, as it favoured waiting for the Fulmar and relying on the Sea Gladiator to fill the gap in the meantime, but as tooling was already being prepared and the workforce needed to be kept busy until the Defiant came onto the assembly line, a political decision was taken to carry on and build the Roc anyway. So the Roc was not wanted even before the first metal was cut, yet unbelievably the workers at



Two views of the interior of a Skua cockpit, which are all but identical to the Roc, with even the gun button on the control column being retained, as when the turret guns were facing forwards the pilot could fire them, but hopefully not thought the propeller disc! The gun sight was also retained on some Roc's, possibly to help when dive bombing but not all Rocs carried this (© Oyvind Lamo)

Boulton Paul appear to have been paid very high bonuses for constructing the type, especially those building its wings.

Not all of the airframe was built by Boulton Paul as construction of the tailplane was contracted out to the General Aircraft Company at Hanworth which was a Blackburn subsidiary, and some of these tail sections are believed to have been fitted to Skuas too, as they were common to both types.

Indeed the Roc was so similar to the Skua that there was no need for an actual prototype, so the first production Roc, L3057, was also the first to fly and this took place on 23 December 1938, at Penfold in the hands of Blackburn test pilot Flt Lt Hugh Wilson. This aircraft then flew north for manufacturer's trials at Brough and after completing test work in March 1939, was flown down to the Aircraft and Armament Experimental Establishment for acceptance tests, which was still at its pre-war location at Martlesham Heath.

The next two Rocs off the production line, L3058 and L3059, soon followed, the turret, armament, handling and performance were thoroughly examined and although handling was generally considered better than the Skua, some minor equipment problems were found which needed attention. An attempt was also made at this time to increase the Roc's performance by fitting alternative propeller blades from a Tiger engine Whitely bomber and although they resulted in a faster rate of climb, for some reason they were not introduced as standard.

During testing, one of the Rocs (L3059) was



A photograph staged for the press showing a Telegraphist Air Gunner talking to a pair of pilots as he is exiting the turret of a Roc. Of interest are the fact that he appears to be sitting where the moving roof section of the central radio compartment should be and also the wire for the tail parachute which runs along the outside of the fuselage to avoid drilling through the watertight compartments in the rear fuselage and retain their integrity (© Getty Images)

the Roc to be fitted with floats so that it could replace the Swordfish, Seafox and Walrus aircraft currently equipping the Catapult Flights aboard capital ships of the Royal Navy. After completing their acceptance trials at the A&AEE in October 1939, two Rocs, L3057 and L3059, were sent to the Blackburn factory at Dumbarton in Scotland to

from the numerous fiords and inlets along the Norwegian coastline, but even with the addition of a large ventral fairing below the tail to try and cure its instability problems, the Roc floatplane was still found to be a dead loss, especially as an operational aircraft, and this plan never progressed beyond the training phase. In fact the Roc was such a bad floatplane that all further trials at the MAEE were eventually cancelled in June 1940, but this did not prevent every production Roc from being built to accept floats if necessary.

Even though trials had proved disappointing, some Roc floatplanes did actually still enter squadron service and 765 Naval Air Squadron (NAS) which was the Seaplane Training School and Pool Squadron based at Lee-on-Solent in Hampshire, had some on strength during 1940, (including L3084 and L3091), used, amongst



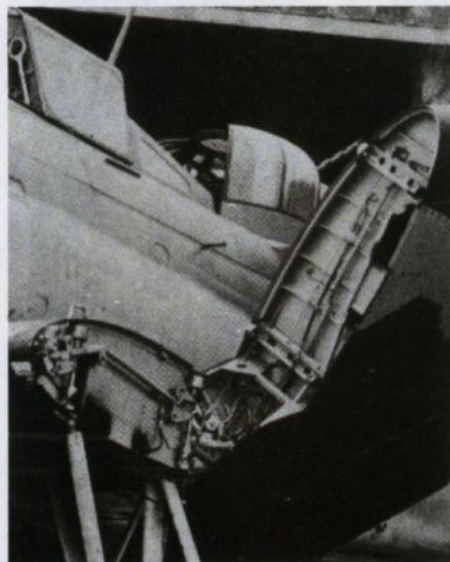
Roc L3105, coded L6R of 806 NAS wearing the early style B Type roundels on its Temperate Sea Scheme with the undersides of its wings painted black and white to meet RAF Fighter Command orders for all land based fighters to be finished accordingly to help recognition from the ground (via Brian Cull)

"...the Roc was so similar to the Skua that there was no need for an actual prototype..."

found to be permanently flying with one wing low because its ailerons were slightly different in thickness, but this was easily cured by doping a length of string along the top of one aileron which raised the wing again, and most of the other more technical snags were eventually sorted out to enable the Roc to be cleared for service.

Roc Floatplane

As well as flying from land bases and aircraft carriers, Specification 26/36 had also been issued for



A close up of the wing fold on one of the early Roc floatplanes (Crown Copyright)

be fitted with Blackburn Shark floats which had been modified to incorporate water rudders so that they could complete floatplane trials at the Marine Aircraft Experimental Establishment (MAEE) at Helensburgh in Scotland, this unit having just been relocated from its pre-war base at Felixstowe.

Unfortunately, the performance of the Roc in this configuration was found to be poor and the type's already low speed was drastically reduced by at least 30mph, whilst it was also found to be so unstable in flight that turning at low altitude was considered extremely dangerous. Indeed Roc L3059 crashed on 3 December 1939 whilst attempting such a turn after suffering engine failure on take off.

Despite this loss, four more Rocs appear to have been fitted with floats at Helensburgh – L3060, L3084, L3089 and L3174 – although two of these were unarmed and used for separate trials. One of the unarmed aircraft, L3174, was equipped as a target tug in order to evaluate the Roc in this role, using a large cylinder under its belly to carry the target banners and sleeves whilst the other unarmed Roc was L3089 which was fitted with a lightweight turret cupola and larger windows in a redesigned central cabin so that it could carry out cine camera trials. These cine camera trials later continued at the A&AEE's new home at Boscombe Down, for which a normal wheeled undercarriage was fitted.

Soon after the German invasion of Norway, a scheme was initiated to equip an entire Fleet Air Arm squadron, No 805 Naval Air Squadron, with eighteen Roc floatplanes which could operate

other things, to train the pilots of 805 NAS who were expecting to fly the floatplane variant on operations. More Rocs, including L3100, L3109 and L3069, were used as floatplanes by 773 NAS in Bermuda between 1941 and 1943 as there was no airfield there until Kindley Field was completed by the US Army in 1943, which finally allowed these target tug Rocs to revert to operating on wheels again.

Performance

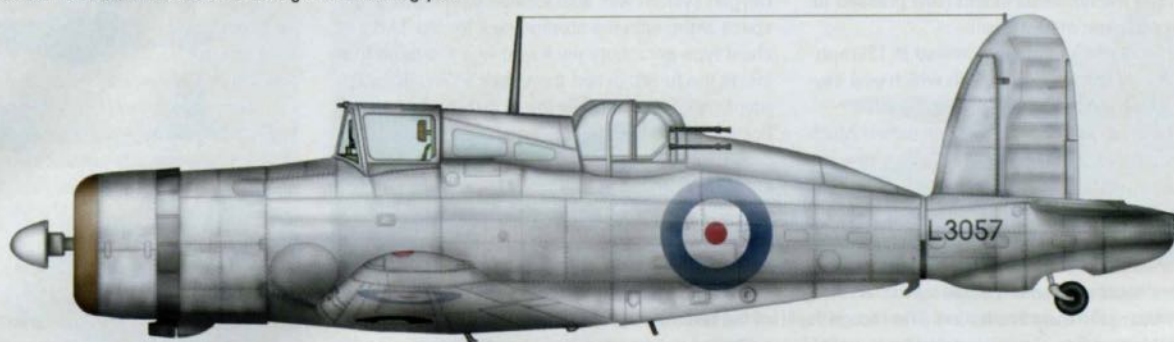
Considering that the Roc had a heavy, bulky gun turret and was powered by the same Bristol Perseus XII 890hp nine-cylinder sleeve-valved radial as the Skua, it could still (theoretically) attain a top speed of 223mph, which was only



Another well known photograph of Rocs from 759 NAS at Eastleigh, which was the Naval Fighter School and Pool Squadron. The nearest Roc is L3114, coded 'C' which is the subject of the box art of the new Special Hobby 1/48th scale kit and also a decal option. It is a bone of contention whether these Rocs were finished in the Temperate Sea Scheme or the Temperate Land Scheme and Special Hobby have elected for the former, however they have forgotten to add black to the underneath of L3114's left wing, which also had a yellow bordered roundel too, so presumably the other wing was white? (Crown Copyright)

Roc L3057

L3057 was the first production Roc which also acted as the prototype and it wears the standard overall silver paint scheme and A1 Type roundels that the early production Rocs were built and delivered in. After trials at various test establishments, including a spell on floats it became an instructional airframe at 6 School of Technical Training at Hednesford in December 1940 but was struck off charge the following year

**Roc L3084**

L3084 also wears the pre-war overall silver colour scheme but wears A1 Type roundels on its fuselage instead along with an unusual set of fin stripes which were thinner than normal. This aircraft was used for quite a number of trials and also became a floatplane at some point too before it was converted into a target tug. It went on to serve with 778 NAS at Lee on Solent between April and June 1940 who used it in floatplane and landplane configuration before moving on to the Royal Aircraft Establishment at Farnborough and in January 1943 it went north to 772 NAS at Machrihanish in Scotland. This Roc was last seen in August 1945 at Eastleigh where it was being used as a static engine test rig

**Roc L3059**

L3059 was the third production Roc and it was used mostly on trials work before it crashed on 3 December 1939 whilst turning at low level after suffering an engine failure on take off during floatplane trials with the Marine Aircraft Experimental Establishment at Helensburgh. It is depicted in the configuration it was in at the time and wears the standard Temperate Sea Scheme with Sky Grey undersides that both meet half way up the side of the fuselage and has red and blue B Type roundels with no fin flash as well as the black and white lower wing surfaces which all land based British fighters were ordered to wear from 1939 until mid 1940



2mph slower than its stablemate, but was still 100mph slower than the RAF's Merlin-engined Defiant! However some ex-Roc pilots have claimed that the type was in fact hard pressed to top 200mph, even at low level!

Just like the Skua, the Roc cruised at 135mph but was much slower in the climb which was saying something, as the Skua was not exactly renowned for its sparkling climb rate either! Much more importantly, considering that both types were to operate side by side, was the fact that the Roc also had a much shorter endurance.

In fact the Roc was only capable of flying for two hours thirty minutes compared to the Skua's four hours twenty minutes, (which was often unofficially stretched to over five hours). The reason for this was because fuel capacity had to be reduced to accommodate the bulk and weight of the Roc's turret, which took up so much room inside the fuselage. This can be determined by the fact that whilst the Skua and the Roc both shared a 39 gallon gravity fuel tank in the nose just behind the engine, the Skua was able to house a pair of 62 gallon fuel tanks in the area between the pilot and gunner, whilst the Roc was only capable of fitting a single 78 gallon fuel tank within the same space, which had to be mounted across the width of the fuselage directly behind the pilot's seat. The remainder of the room behind this tank was taken up by a cramped radio position due to the radios being repositioned from behind the gunner's position, as in the Skua, to balance the heavy turret out. This ensured that the aircraft's centre of gravity would be maintained in the centre as well as enabling the Telegraphist Air Gunner (TAG) man-

ning the turret to gain access and operate the radio sets.

As well as the radios and fuel tank, the crew's oxygen system was also located within this small space along with the storage rack for the TAG's chest type parachute pack as it was too large to fit inside the turret. In fact there was so much equipment shoehorned inside the Roc that when Identification Friend or Foe (IFF) equipment was introduced into service during early 1940, there wasn't enough room left to fit this vital piece of kit, which would affect the type's future employment.

To allow the Roc's TAG to train his four 0.303 inch Browning machine guns around the sky without snagging them on parts of the aircraft, the roof of the radio position and the aerodynamic fairing on top of the rear fuselage were both hinged to move up and down automatically in order to let the guns pass. This was done using pneumatic rams operated by electrical contacts on the turret ring – but there was a snag with this system, because if the turret was traversed around too much the air soon drained from the system leaving insufficient pressure for the brakes to work on landing! Thankfully this dangerous trait was soon recognised and dealt with by introducing modifications which enabled the gunner to manually lock both of these fairings down before using his guns in action, along with another that ensured enough air would still be retained for the brakes to work on landing.

As mentioned earlier, the turret fitted to the Roc was a Boulton Paul Type A Mk IIR which was licence built from a French design but with extra modifications added and it could traverse a full



Another photo from the well known photo shoot which featured Rocs from 759 NAS. The nearest aircraft also has A Type roundels on top of the wings and has engine cowlings and nose panels painted with the older style of camouflage which had a higher demarcation line to the undersides whilst the next panel along seems to be painted black. The rest of the Rocs display a real hotch potch of camouflage and markings, including what looks like traces of the black undersides mentioned later in this article and the presence of so many B Type roundels on their fuselages may also be evidence of this scheme too, although these now have yellow rings to make them more visible (Crown Copyright)

360 degrees whilst the guns could be elevated upwards to 85 degrees. For some unknown reason the guns could not be depressed downwards below the horizontal! This meant that if the gunner wished to hit a target below him the pilot had to bank the entire aircraft over on its side and when the fairings were lowered and the guns were facing sideways the extra drag that this incurred ensured that the speed of the Roc soon fell off dramatically, normally allowing the target to outstrip its attacker!

To prevent the TAG from shooting bits of his aircraft away by accident, the turret also had electrical circuit breakers incorporated into it which stopped any single gun from firing if it was facing towards a part of the airframe, but the limited field of fire caused by obstructions such as the tail, wings and rear fuselage often meant that only one of the four guns could be free to fire at any one time, drastically reducing the Roc's (and also for that matter the Defiant's) firepower.

Introduction into Service

The Roc was first delivered for service use to the Central Flying School at Upavon in Wiltshire during April 1939, in order for the pilots handling notes to be compiled. Later that month more were delivered to No 803 NAS at Worthy Down in Hampshire so that carrier trials could be carried out aboard *HMS Ark Royal*. Rare photographs of one of these overall silver finished Rocs wearing large Red/White/Blue roundels landing aboard the carrier to prove that these took place! (These photos should soon appear in a new book about the Fleet Air Arm from Dalrymple and Verdun!)

In June and July 1939, six more Rocs were delivered to Worthy Down for 800 NAS, to supplement its Skuas and 769 NAS also had six on strength when it was renumbered to become 801 NAS once again, at Hatston in the Orkneys, during January 1940. The last fully operational unit to receive the Roc was 806 NAS which took delivery of its four Rocs, (including L3075 and L3105), at Worthy Down in February 1940, but as



These are poor but very interesting photos of a Roc coded P7C of 760 NAS at Eastleigh in 1940 which has an extremely large A1 Type fuselage roundel with fin stripes and appears to be wearing the Temperate Land Scheme of Dark Earth and Dark Green. It is still fully armed with 4 x Machine Guns in its turret and 760 NAS was a fighter pilot pool squadron...



mentioned earlier, 805 NAS was also to have operated the type.

Unlike the other squadrons, it was to have been solely equipped with the type by operating eighteen Roc floatplanes for service in Norway. It did receive a few land-based Rocs to train on at Donibristle before its pilots progressed on to Leeson-Solent to complete a seaplane conversion course on the Roc floatplanes of 765 NAS, but by then it had become blatantly obvious that the Roc floatplane would have been an operational death trap and so the 805 NAS was disbanded, before receiving any more aircraft and its personnel were dispersed to other units.

As well going to operational units, some of the initial Roc deliveries were also made to second-line Fleet Air Arm units numbered in the 700 series. One of these, 769 NAS, has already been mentioned, and it had originally formed out of 801 NAS to operate in the Fighter Deck Landing Training role before becoming 801 NAS once more and operational in January 1940.

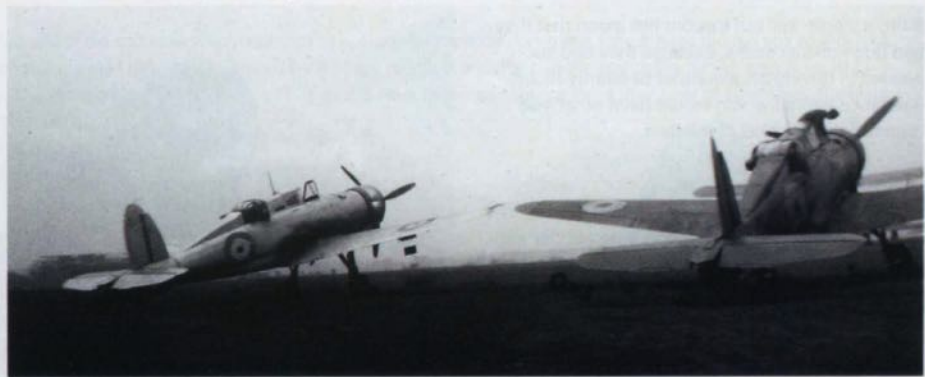
Other second-line units to use the Roc around this time included 759 NAS at Eastleigh in Hampshire, which was the Fleet Air Arm Fighter School and Fighter Pilot Pool, and 758 NAS and 774 NAS at Eastleigh and Worthy Down respectively, which had some Rocs on strength as gunnery trainers for new TAGs to learn how to use the power operated turret. However the largest single user of the type in second line service at this stage of the war was not the Royal Navy but the RAF, and No 2 Anti-Aircraft Co-operation Unit (2 AACU) in particular, which used its Rocs as target tugs. At one time 2 AACU had well over twenty Rocs on charge

"The Roc actually saw quite a bit of action – starting in April 1940 whilst defending Scapa Flow..."

which were distributed amongst its three Flights at various locations and detachments at Gosport in Hampshire, Roborough, Eastchurch and Detling in Kent and also Donibristle in Scotland. As the war continued and more Rocs became available once the type had been withdrawn from front-line service, many other non-operational units went on to operate the type from air stations all across the world, which will be dealt with later.

Returning to the Roc's introduction to front-line service, the intention was that the Roc would operate alongside the Skua and each front-line squadron was to comprise one third Rocs and two thirds Skuas, so that each of the basic three aircraft fighting sections or 'vics' could be made up of a pair of Skuas and a single Roc – the theory being that the Roc would provide the Skuas with fighter cover! Obviously with the benefit of hindsight this was quite a naïve idea which was not going to work very well, especially as both types had widely differing performance and range capabilities.

Perhaps the best example of this difference in performance was when 803 NAS was based at Hatston in the Orkneys during the early stages of World War Two, when it was the sole fighter unit defending Scapa Flow naval base. Enemy aircraft would often attack British warships and shipping further out to sea, so 803 NAS was regularly employed mounting long-range interceptions and patrols to protect them, however the Rocs often had to turn back for home early due to lack of fuel and leave the accompanying Skuas to carry on alone. On 23 October 1939, Roc L3063, flown by



Here, an early silver finished Roc wearing A Type roundels sits alongside another that has been camouflaged in an intriguing scheme with black undersides and oddly proportioned red and blue B Type roundels and traces of a camouflage pattern on top, which may be the Temperate Sea Scheme, note how the demarcation line of the black undersides does not run right along the side of the fuselage but drops down from the nose to the wing leading edges and then from the wing trailing edges runs up to the tail. This camouflage Roc would appear to have been hastily painted and may previously have been silver as its red and blue roundels are the same size as the aircraft alongside (© Captain PCS Chilton AFC, RN via Matthew Willis)

Petty Officer L R Tregillis and Naval Airman R Eason, had to return home alone in this manner from such a patrol but they must have left it too late and ran out of fuel before reaching land as they were never seen again.

Due to the Roc's unsuitability for these long-range sorties, 803 NAS's commanding officer Lt Cdr D R F Campbell, made a request to the Admiralty for his Rocs to be replaced by extra Skuas so that he could have more aircraft available for long range patrols, but this was refused. Lt Cdr Campbell finally got his own way, however, during March 1940 when a comprehensive fighter control network was established in the

Orkneys and Norway

The Roc actually saw quite a bit of action, and an aircraft of 803 NAS opened the type's account in April 1940 whilst defending Scapa Flow when it damaged a He 111 during a large air raid on the anchorage. That same month the Roc also went to sea again aboard HMS Ark Royal, but this time operationally, when five Rocs were embarked to take part in the Norwegian campaign, two of them belonging to 800 NAS and three to 801 NAS, to complement each unit's nine Skuas. Some Rocs are also believed to have flown from HMS Glorious and HMS Furious around this time, but they may just have been short detachments from HMS Ark Royal to maintain air cover whilst ships withdrew to refuel.

Flying from these carriers, the Roc's main responsibility during the Norwegian Campaign was to provide Combat Air Patrols over the fleet alongside the more numerous Sea Gladiators of 802 and 804 NASs from HMS Glorious, thus freeing the longer ranged Skuas to concentrate on patrols and strikes over Norway along with the Swordfish of the TBR Squadrons. As well as mounting these standing patrols the Rocs were often scrambled to intercept enemy aircraft approaching the fleet, and on 27 April Rocs were sent aloft twice to repel such intrusions, although no claims were recorded. Indeed during the Norwegian campaign the Rocs did not manage to

Orkneys, because every aircraft now had to be equipped with IFF and as the Roc was unable to carry this equipment, they had to go! This enabled 803 NAS to become an all-Skua unit with a complement of eleven aircraft just in time for the Norwegian campaign.

Into Action

It has been claimed over the years that the Roc never saw combat action and never even flew from a carrier deck, but neither statement is true.



Another Roc from Eastleigh finished in the black scheme with camouflaged upper surfaces but this time the demarcation line between the two appears to run all the way along the centre of the fuselage, unlike the previous Roc. It has retained the A1 Type roundels under the wings which appear to be finished in bright pre war colours. Note the dark (Black?) painted Sea Gladiators in the distance! (© Captain PCS Chilton AFC, RN via Matthew Willis)

claim a single 'kill' but this did not mean that they had been unsuccessful, because they had succeeded in driving off a number of enemy reconnaissance aircraft which would have otherwise reported the position of the fleet.

English Channel

The Roc next saw action over the English Channel when 801 NAS and 806 NAS operated under the control of RAF Coastal Command between May and June 1940, taking part in 'Operation Dynamo', the evacuation from Dunkirk and other operations along the French coast. Although based at Worthy Down in Hampshire, both units usually took off early each morning to operate from advanced airfields at Detling or Manston in Kent, and the first unit to arrive here was 806 NAS on 28 May 1940, followed three days later by 801 NAS.

The Rocs of both squadrons initially flew fighter patrols over the Channel to protect the shipping picking up the British Expeditionary Force and its Allies from France and during these patrols they usually flew as originally intended within a 'vic' formation alongside a pair of Skuas.

One such patrol from 806 NAS was flying above a convoy on 29 May 1940 when they noticed bomb splashes in the sea near to some ships followed by sightings of a number of Ju 88s, so whilst the accompanying pair of Skuas dived in to attack these fast German bombers from above, the Roc, flown by Midshipman Day and Naval Airman Newton, managed to sneak in from underneath and shoot the belly out of one of the Ju 88s, sending it down in flames and claiming the only 'kill' known to have been scored by a Roc. This Roc crew used the same tactics again a few days later and almost downed another bomber when they scored hits on a He 11,1 but this time they could only claim it as 'damaged' after it was last seen disappearing into a cloudbank trailing smoke.

Most of the front line Rocs seem to have been flown by junior pilots such as Midshipman or newly arrived Sub Lieutenants because the more senior men preferred to fly the Skua, but this may have been a good thing as the class and rank distinctions which were prevalent in the Royal Navy at the time between commissioned officer pilots and none commissioned TAGs 'from the lower decks' were not exactly conducive to good team work!

Indeed during the early war years, conversation between officers and rating crew members



Another Skua but this time with a B Type fuselage roundel in place and A Types under the wings. Like the Roc in the first photo the demarcation line of the black undersides on the fuselage of this aircraft appears to drop down from the nose to meet the leading edge of the wing and then rise up again from the trailing edge to touch the leading edge of the tailplane. It is also fitted with Light Stores Carriers which might be a clue to the reason for this nocturnal camouflage scheme; it is unlikely that they were being used as night fighters as night raids against Britain did not really start until mid to late 1940, so these Skuas and Rocs may just be working in conjunction with the MTB's and MGB's of the Royal Navies Coastal Forces to act as flare droppers against E Boats in the English Channel, because these fast craft regularly clashed with each other during the night for most of the war (© Captain PCS Chilton AFC, RN via Matthew Willis)

was not encouraged, even in the air and it was commonplace for a pilot to not even know the name of his TAG, whilst these ratings were also excluded from all briefings! Because the Roc pilots were often more junior, these restrictions could sometimes be more relaxed, thus allowing the TAG to have more input into the operation of the aircraft, which in the case of Midshipman Day and Naval Airman Newton is probably what made them such an efficient crew, as to get the best out of the Roc, (or the Defiant for that matter), the crew had to operate as a team.

As well as mounting fighter patrols the naval fighter squadrons were also used in a more offensive manner during 'Operation Dynamo' as 801 NAS mounted a number of dive bomber sorties in support of the troops defending Dunkirk. Most of these sorties were mounted using Skuas only and are described in more detail in my previous article about the Skua, (see October 2007, Vol 6/10 issue of 'MAM'), but as losses mounted, the Rocs were

also used later on as they were just as capable in this role.

Even when 'Operation Dynamo' had finally drawn to a close by 4 June 1940, the fighting in France still continued and British troops were still fighting around Calais, Boulogne, Le Havre and St Valery, whilst two extra Divisions of British and Canadian troops were shipped across to Cherbourg during the second week of June in an attempt to retain hold of a 'fortress' on the Brittany peninsula! To support these operations and eventually evacuate the men back from France, the surface fleet of the Royal Navy was as busy as ever in the English Channel, and to help protect them from air attack 801 NAS and 806 NAS continued mounting regular patrols over the shipping routes.

Whilst this shipping was protected by fighters during daytime it was still vulnerable at night and some were sunk during the hours of darkness by German S Boats, so to help counter this the Rocs and Skuas were drafted in to help.

A number of non-operational Rocs and Skuas from 759 NAS at Eastleigh in Hampshire had been hastily painted with black undersides during early 1940 and these could well have been engaged in nocturnal anti-S Boat operations in conjunction with MTBs and MGBs of the Royal Navy's Coastal Forces. After all, this unit was tasked with trialling new operational roles for both types and as the unit included the Naval Fighter Pool there would have been enough suitably qualified operational pilots to supplement the unit's instructors. If so, then their most likely role would have been to act as flare droppers to illuminate the search area of the MTBs and MGBs, as this was before small shipboard radar had been invented!

Although the role just described is just educated guesswork, 801 NAS did get in on the act of supporting anti-S Boat operations by attacking them in their own base. On the morning of 9 June 1940, 801 NAS despatched a force of five Rocs and four Skuas to carry out a dive-bombing attack on the S Boat base in Boulogne harbour



Not a Roc but a Skua, but still finished in the same camouflage colours and with a demarcation line running along the middle of the fuselage. No fuselage roundel has been painted on yet, possibly indicating an aircraft that had previously worn the carrier band of HMS Ark Royal, as seen on a Sea Gladiator used by 769 NAS, and the old silver finish is showing through the scuffed and peeling camouflage paint (© Captain PCS Chilton AFC, RN via Matthew Willis)

Roc L3105, L6R, 806 NAS, Worthy Down, early 1940

L3105 was serving with 806 NAS, Worthy Down, early 1940 whilst the unit was still working up to operational capacity during this time it wore the red and blue B Type roundels seen here but by the time the unit went into action these would have been replaced by A1 Type roundels and the 'L' in the unit codes, which stands for HMS Illustrious, was dropped so that only the squadron identity '6' and the aircraft within unit code 'R' would have remained superimposed over a set of fin stripes. The black and white wing undersides would have been retained but with roundels applied. After service with 806 NAS this aircraft went to 760 NAS at Yeovilton in February 1941 but was destroyed in a fatal crash at a nearby farm the following month on the 19th March 1941, killing both crewmen Sub Lt Darbyshire and Leading Airman Howes

**Roc L3085, No 2 Anti Aircraft Co-Operation Unit, Royal Air Force, September 1940**

L3085 was flown by Pilot Officer D H Clarke and Sgt Hunt when they fought a running battle over the English Channel with a German He 59 biplane floatplane on 26 September 1940 during the height of the Battle of Britain. The 'Saint' logo on the side of the fuselage was the pilots personal marking and the Roc retained its Fleet Air Arm style Temperate Sea Scheme which had been updated by the addition of A1 Type roundels and a fin flash, although it is unsure whether the black and white painted wing under surfaces were still applied and whether or not they had roundels applied. Following service with 2AACU this Roc returned to Royal Navy service with 778 NAS at Arbroath between October 1941 and April 1942, then went to 771 NAS at Twatt in the Orkneys in August 1942 where it had quite a few accidents but continued to operate as a target tug until 13 February 1943 when it was ditched into the sea following engine failure

**Roc RO-150, Dyce, Scotland, February 1940 pending delivery to Finland**

RO-150 was one of thirty-three Rocs gathered together at Dyce in Scotland during February 1940 pending their delivery to Finland via Sweden. It wears standard British Temperate Sea Scheme colours and has had Finnish markings and serial applied however the pale blue Finnish 'swastika' markings have been temporarily painted over using white distemper paint for obvious reasons whilst in Britain and also because Sweden would not accept transit flights by aircraft in military markings, which just left a plain white ring. In the end these Rocs could not be delivered to Finland in time to take part in the 'Winter War' with Russia and as an armistice was signed before they left so they reverted to British markings and serials again and remained in Britain

**Unidentified Roc serving at Eastleigh in early 1940, possibly with 759 NAS, which was the Naval Fighter School and Fighter Pool Squadron**

A number of Skuas and Rocs at Eastleigh were finished in these nocturnal colours and could possibly have been used on anti E-Boat operations in the English Channel in conjunction with Motor Torpedo and Motor Gun Boats of the Royal Navy's Coastal Forces to act as flare droppers. This is the most likely reason for their colours as night raids on the UK did not really commence until mid to late 1940 so it is unlikely that they were being used in the night fighter role. Many of the Rocs at Eastleigh seem to have been early production aircraft which had retained their overall silver finish and A1 Type roundels until being swiftly re camouflaged, possibly distemper as the paint chipped easily to reveal silver underneath and the red and blue B Type roundels with small red centres are exactly the same size as the A1 Type on the silver aircraft. All Type roundels were retained under the wings



© Kjetil Akra 2008

and for this the Rocs carried their usual pair of 250lb bombs under the wings whilst the Skuas had 500lb bombs under the fuselage. Although there was some opposition in the form of flak, this early morning attack proved to be so successful that the same aircraft returned again in the afternoon carrying additional World War One vintage 20lb Cooper bombs under their wings in light series stores carriers to supplement their usual bomb loads.

By the time of this second raid, the Germans had moved their S Boats across to the other side of the harbour and the flak defences were much heavier, but both raids proved to be a great success, resulting in one S Boat being sunk and others badly damaged, whilst a convoy of troop carrying lorries on the dockside was also cut to ribbons by a strafing attack and all of the Skuas and Rocs returned safely home from both raids unharmed.

The same five Rocs of 801 NAS were accompanied by four Skuas for another dive-bombing



The RAF also flew the Roc too and here is L3085 of A Flight No.2 Anti Aircraft Co-Operation Unit at Gosport. The figure could be Pilot Officer 'Nobby' Clarke, who's personal 'Saint' motif is painted on the fuselage as he flew this aircraft along with Sgt Hunt on the evening of the 26th September 1940 at the height of the Battle of Britain, when they intercepted and damaged a German He59 floatplane over the English Channel during an air sea rescue search (© T Bishop)



Frontal view of another nocturnally finished Skua with A Type roundels under the wings and paint flaking away along the leading edges where there is also a definite demarcation between the upper and lower surface colours. The propeller blades would appear to be light grey and the spinner red whilst at some point the Skua might have had the black and white painted undersides as the left hand undercarriage is black and that on the right is much lighter. In the background can be seen more black coloured Sea Gladiators along with a Percival Gull on the left (© Captain PCS Chilton AFC, RN via Matthew Willis)

attack on 20 June 1940 against a heavy artillery battery that was being set up on top of the cliffs at Cap Blanc Nez near Calais. This had been spotted earlier in the day by a low-flying reconnaissance Skua and learning from the mistakes made during the attack against the *Scharnhorst* in Norway by Skuas of 800 NAS and 803 NAS, (see October 2007 issue of 'MAM'), which had been totally decimated by *Luftwaffe* fighters, this strike by 801 NAS was to be accompanied by a fighter escort of twelve RAF Hurricanes.

The attacking Skuas and Rocs entered their dives from 2,000ft to drop their bombs from 1,000ft and despite an intensive anti-aircraft barrage over the target, the raid was a great success as they managed to score four direct hits on the battery along with many near misses. Roc 'H', flown by Sub Lt Day and Naval Airman Berry, was shot down in the process, its crew having no chance of escape as it dived straight into the sea trailing smoke. In memory of these men, one of the Rocs built in the following modelling article represents this machine.

The Battle of France eventually finished on 22 June 1940, when the French signed an Armistice with Germany, but after the Dunkirk evacuation had finished, a further 250,000 troops had been evacuated from various other ports along the French Channel coast. With the job of protecting this shipping now complete, 801 NAS and 806

NAS prepared to embark for carrierborne operations aboard *HMS Ark Royal* and *HMS Illustrious* but there was no place for the Rocs, as they had proved to be totally outclassed as fighters, so they were relegated to second-line duties where they could still provide useful service.

Battle of Britain

Although it was now destined for second line service, this was not the last time that a Roc would

see action, as the RAF also got in on the act by using one of its own Rocs at the height of the Battle of Britain. This occurred during the early evening of 25 September 1940, when Roc L3085 of 2 Anti Aircraft Co-operation Unit (2AACU) at Gosport, flown by Pilot Officer (later Sqn Ldr) D H 'Nobby' Clarke and his replacement gunner, Sgt Hunt, encountered an enemy aircraft over the English Channel.

At the time they had been conducting an air-sea-rescue search looking for three missing Hurricane pilots and were fifteen miles south west of St Catherine's Point on the Isle of Wight, when they spotted an aircraft in the distance which they at first took to be a Swordfish floatplane undertaking a similar search.

As this biplane slowly drew closer they noticed that it was adorned with black crosses and although they could still not identify what it was – it was actually a German He 59 twin engined floatplane conducting a similar air-sea-rescue search looking for missing German airmen.

As the Roc flew closer to investigate, still not sure whether or not they were allowed to attack a fellow air-sea-rescue aircraft, (although neither wore red crosses), the German aircraft opened fire on them and its pilot dived his large slow biplane down to wave top height to protect its vulnerable undersides as he ran for home. Pilot Officer Clarke used the superior speed of his Roc to overtake the enemy aircraft, (which cannot have been said very



Another nocturnally finished Skua that is fitted with light stores carriers under the wings, note the Rocs and a Hawker Audax in the distance. Maybe the Skuas and Rocs became involved in flare dropping, if that is what they were doing, after a conversation in the pub between naval officers from the air and coastal branches as a mutually beneficial arrangement to light up E Boats at night for the MTB's and to keep trained fighter pilots in the Pool who were awaiting posting in flying practice and to give them more night experience? (© Captain PCS Chilton AFC, RN via Matthew Willis)

often about the Roc!), and mounted a couple of unsuccessful sweeping attacks across its bows, during which the gunners of both aircraft exchanged fire.

During these attacks the Roc received some superficial damage from return fire, so Plt Off Clarke decided to change his tactics and flew alongside the He 59, at a range of 300 yards, but as it was flying so low and the turret guns were not designed to be depressed downwards, the Roc would have to be banked onto its side whilst literally skimming the wave tops so that Sgt Hunt could fire 'broadside' into the German aircraft.

However this also made his own aircraft a sitting target for the German gunners who were able to drill rounds into the Roc in return, during a low-level, running battle, which headed across the Channel at no more than 150mph towards the French coast with the light starting to fade fast. This chase lasted for twenty-five minutes until land started to appear over the horizon, but just as Pilot Officer Clarke prepared to turn back for home, his Roc received a number of hits in the cockpit area, which damaged the instruments and windscreen as well as hitting the engine and seriously holing the main fuel tank!

With fuel pouring from this tank and the engine misfiring it was now touch and go whether the Roc would be able to stay in the air, let alone make it back across the Channel, but by switching over to the smaller gravity tank mounted behind the engine there was just enough fuel to reach Gosport – although the Roc's engine finally ran dry and stopped as they taxied into dispersal!

Both aircraft had been hit a number of times during this encounter and Pilot Officer Clarke accordingly submitted a claim for one He 59 damaged, but his own aircraft also had ten bullet holes in it, including two in the fuel tank made by incendiary bullets which had luckily been doused by the petrol before they could reach the explosive vapour, so no doubt the Germans probably made a similar claim for the Roc!

Pilot Officer Clarke claimed that his Roc, L3085, was finished in standard Fighter Command camouflage, which should have been Dark Green, Dark Earth and Sky, but a photo exists showing it to be finished in Fleet Air Arm style Temperate Sea Scheme colours with his personal red spinner and distinctive 'Saint' motif painted on the side of the rear fuselage just behind the roundel, so was he mistaken or was it repainted soon after the photo was taken?

Much later, on 13 June 1941, another Roc,



A rare view of another RAF Roc, again from No.2 AACU but this time from C Flight at Roborough. This Roc is L3166, coded JQ-B and unlike the previous RAF Roc which has retained the Fleet Air Arm style Temperate Sea Scheme, this one is finished in RAF style Temperate Land Scheme colours of Dark Earth and Dark Green with yellow and black striped undersides and has had its turret removed in order to fit a wind driven target tug winch instead. The man alongside is Flight Lieutenant WW Wakefield and under the belly of the Roc is a container for extra target banners and drogues (© HWW Wakefield)

Roc Squadrons, Their Locations and Roles

Fleet Air Arm – First Line Roc Units

- 800: Worthy Down/Ark Royal/Hatston
Fighter-Dive Bomber
- 801: Hatston/Ark Royal/ Detling
Fighter-Dive Bomber
- 803: Worthy Down/Ark Royal/Wick/Hatston-
Fighter-Dive Bomber
- 805: Donibristle/Lee on Solent
for floatplane course – Floatplane Fighter
(Never Operational)
- 806: Worthy Down/Hatston/Detling/Illustrious
Fighter-Dive Bomber

Fleet Air Arm – Second Line Roc Units (Most used Rocs alongside other types too)

- 725: Eglinton-Northern Ireland
Fleet Requirements Unit
- 758: Eastleigh/Arbroath
TAG-Gunnery Training
- 759: Eastleigh/Yeovilton
Fighter School/Pool Sqn
- 760: Eastleigh/Yeovilton
Fighter Pool Sqn
- 765: Lee on Solent floatplanes
Seaplane School/Pool Sqn)
- 769: Donibristle-Scotland/ HMS Furious
(ex 801- Deck Landing Training)
- 770: Donibristle/Craig-Scotland
Fleet Requirements Unit
- 771: Hatston/Twatt-Orkneys
Fleet Requirements Unit
- 772: Machrihanish-Scotland
Fleet Requirements Unit
- 773: Bermuda(including floatplanes)
Fleet Requirements Unit
- 774: WorthyDown/Aldergrove/Evanton-TAG
Gunnery Training
- 775: Dekheila/Fayid-Egypt
Fleet Requirements Unit
- 776: Speke/Woodvale/Lee/Millom/Llanbedr/Usworth
Fleet Requirements Unit
- 777: Eastleigh/Hastings - Sierra Leone
Fleet Requirements Unit/Fighter Pool
- 778: Lee on Solent
Service Trials Unit
- 782: Donibristle-Scotland
Communications
- 787: Duxford
Naval Air Fighting Development Unit
- 789: Wingfield - South Africa
Fleet Requirements Unit
- 791: Arbroath-Scotland
Fleet Requirements Unit
- 792: St Merryn
Fleet Requirements Unit
- 793: Ford/Piarco – Trinidad
Fleet Requirements Unit
- 794: Yeovilton- Fleet Requirements Unit

L3136, of A Flt, 2 AACU, was towing targets over the gunnery ranges when it too encountered an unidentified enemy aircraft, but again the results were inconclusive and the Roc returned home with two bullet holes in what must have been the last Roc combat of the war.

Other Rocs from 2 AACU were also used in front line role but in a much different way as they never even took off! Following a raid by Stuka dive bombers on Gosport on 16 August 1940 which damaged a small number of Rocs from A Flight, the station commander ordered some Rocs be dispersed around the perimeter of the airfield and picketed down to serve as ground based anti-aircraft batteries, to help bolster the

RAF – Roc units

- 2 Anti Aircraft Co-Operation Unit- Target Facilities
- A Flight – Gosport
- C Flight – Roborough
- D Flight – Donibristle/Detling
- 24 Sqn. Hendon – Communications (eg L3120)
- 241 Sqn.Inverness – Army Co-Operation (eg.L3069)
- 22 Army Co-Op Group – Farnborough/Andover –
Army Co-Operation (eg L3120/L3161)
- 1622 Flight – (ex A Flt 2AACU) – Gosport – Target
Facilities
- 1923 Flight – (ex C Flt 2AACU) – Roborough – Target
Facilities
- 1624 Flight – (ex D Flt 2AACU) – Donibristle/Detling
– Target Facilities
- No.1 (Coastal) Operational Training Unit – Sillith –
Training (eg.L3136)
- Roc Flight Odiham – Storage Unit (Awaiting 110 Sqn
RCAF)

RCAF*

- 110 Squadron* – Odiham
- Became 400 Sqn in March 1941 and used as a trials
unit with various types such as Lysanders and Rocs
before becoming operational with Tomahawks –
Army Co-Operation (Trials)



Roc Floatplane L3059 at the MAEE at Helensburgh whilst undertaking trials, late 1939 to mid 1940. It wears the standard Temperate Sea Scheme with 8 Type roundels and black and white wing undersides

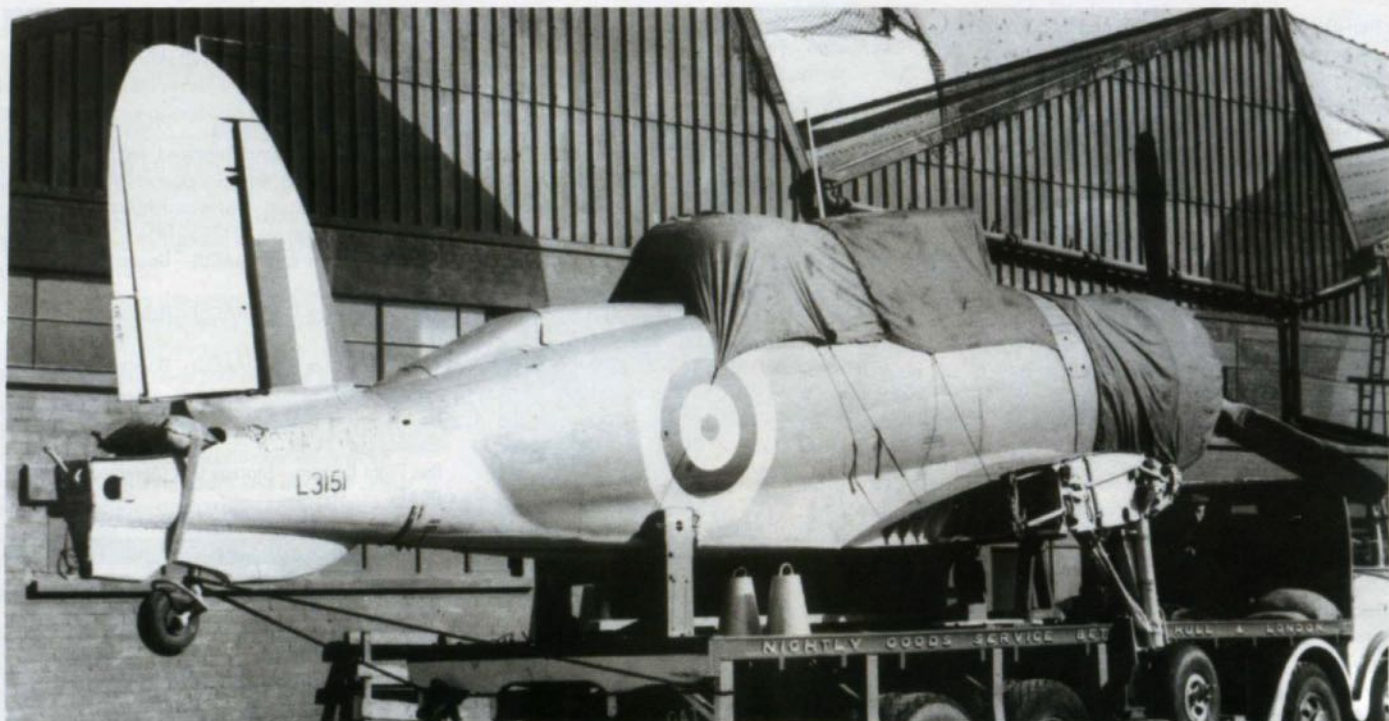
anti-aircraft defences in case of another attack – which was possibly the best use of the Roc under the circumstances!

An Operational Conclusion

During the Battle of France, the Westland Lysander had proved to be highly vulnerable in the Army Co-Operation role, so with the UK expecting an imminent German invasion during the latter half of 1940, the RAF considered replacing it with either the Roc or the similarly armed Defiant turret fighters, especially as the Roc had a useful dive-bombing capability.

Following trials with No 241 Sqn and 22 Army Co-Operation Group, the threat of a German invasion began to wane so this plan did not go ahead, however a number of Rocs were delivered to RAF Odiham between August and November 1940 for No 110 Sqn, Royal Canadian Air Force, which was a Lysander unit that had arrived in June 1940 from Canada. This unit was used to conduct various trials for a while, which is probably why it had Rocs on strength, but after becoming operational in March 1941, No 110 Sqn RCAF was renumbered 400 Sqn to become the first operational unit in Army Co-Operation Command to fly Curtiss Tomahawks in the fighter/reconnaissance role – a much more suitable aircraft for the role than the Roc!

Another intended recipient of the Roc was Finland which was fighting its 'Winter War' against Russia. The small Finnish armed forces were receiving aid from sympathetic countries around the world and part of Britain's contribu-



The Roc on this civilian low loader is L3151 which is wearing the later style of the Temperate Sea Scheme introduced during 1941 and still has its turret cupola fitted. Judging by the writing on the civilian low loader this aircraft is probably at the Blackburn factory at Brough, maybe to have work undertaken to convert it into a target tug? (via Ian Gazeley)

tion were aircraft such as the Gladiator, Gauntlet, Blenheim, Lysander and Hurricane, along with thirty-three Rocs.

All these Rocs were assembled at RAF Dyce in Scotland to be prepared for their long ferry flight to Finland via Sweden, and Finnish markings and codes were applied over their standard Fleet Air Arm camouflage, although for obvious reasons and the fact that Sweden could not accept ferry flights from aircraft bearing military markings, the blue Finnish swastikas were overpainted with white distemper, leaving a plain white disc. The Finns intended to use the Rocs as reconnaissance/dive bombers, but before they could set off from Scotland, a peace agreement was signed

in front-line service, after it was declared obsolete many more units would go on to fly the type.

Most Rocs leaving front-line service became target tugs and the great majority had their turrets removed so that they could be equipped with a B Mk IIa wind-driven winch which was fitted in the now 'open rear cockpit', powered by a four-bladed propeller on a pivoting pylon, that projected out of the right hand side of the aircraft in and out of the slipstream. Inside the rear cockpit storage was provided for two 3ft diameter sleeve drogue targets and three 55ft flag targets. Although this was the most common fit, some Roc target tugs were equipped with an electric winch which did not need an external wind-driven propeller. Due to

this, many of these Rocs retained their empty turret cupola so that the winch operator could be protected from the elements, and they must have been much more popular, especially in the Orkneys in winter!

In 1940 the Fleet Air Arm only had the biplane Swordfish and Shark available in the target-towing role, both of which were desperately slow, and although a small number of Rocs had already been converted to carry out this role, especially for the RAF, hardly any were available to the Navy. However this changed when the Roc was declared obsolete for operational duties and the redundant airframes were soon snapped up for conversion into target tugs because their extra speed would provide much more realism, especially for ship-board gunners.

At the same time, the number of Fleet Requirements Units (FRUs) had started to rapidly increase, sprouting up all over the country and indeed

"The Roc saw action in 'Operation Dynamo', the evacuation from Dunkirk and in the Battle of Britain..."

with the Russians on 12 March 1940, and so the Rocs remained in Britain where they were converted into target tugs instead.

Despite having some 'moments', the Roc was clearly unsuitable for first-line service – its performance was just not good enough and its armament concept was flawed – so once this had been finally realised, the type was relegated to second-line duties. Here it served mostly as a target tug, which after all was a role that been written into the original specification. However if the Rocs that were intended for Finland had actually been received and gone into action against the Russians as dive bombers who knows whether they would have been successful or not? Considering the Finns' astounding track record with other outdated and inferior aircraft, it is highly likely that they would have proved effective, and just like the Brewster Buffalo it could well have gone on to become a much more famous aircraft!

Second-Line Service

Although, as already mentioned, a number of second-line units were using the Roc whilst it was still



A great view of Roc L3194, coded 'W' of 775 NAS at Dekheila in Egypt, probably during early 1941. It still wears the scheme that would have been worn by operational Rocs at the time of the Dunkirk evacuation with black and white wing under surfaces still in place but it has had a black code letter added to the fuselage since arriving in Egypt where its turret was also removed, probably to serve as a target tug (via Ian Gazeley)

Roc L3100, 773 NAS, Bermuda 1943

Following the opening of Kindley Field airbase in Bermuda the Roc target tugs of this unit which had previously been flying on floats had their land undercarriages re fitted just like this aircraft, which has had its turret removed and well represents the tired look that many Rocs assumed whilst in second line service. Its Temperate Sea Scheme colours of Dark Slate Grey and Extra Dark Sea Grey which have been brought down the side of the fuselage have become heavily weathered by the sun and sea air and its undersides and fin are coloured Sky but instead of wearing the prescribed new C1 Type roundels and fin flash it still wears the old A1 Type roundels and fin flash instead, which was quite common for such far flung units. Note too how the rear of the propeller blades are painted black as an anti glare measure for the pilot, which was a common Roc and Skua feature and that the spinner is missing too. Before delivery to Bermuda this Roc had previously served at Eastleigh during 1940 with 760 NAS

**Roc L3147**

Not a lot is known of this aircraft but it appears to have served at one point with the RAF as it featured in a press photo shoot, possibly in early 1941 flown by a Flight Lieutenant Thompson. It wears the 1941 style Temperate Sea Scheme seen on other naval types such as the Swordfish and Albacore where the upper surfaces were brought further down the sides of the aircraft but the undersides, which had been refinished in the new colour Sky, now sweep up towards the nose and tail

**Roc L3127, 789 NAS, Wingfield, South Africa, 1944**

This aircraft had once served with 2 AACU in the UK and like most target tugs its turret has been replaced by a B Mk IIa wind driven winch in the rear cockpit. It appears to have been repainted in the yellow and black target tug stripes after arriving in South Africa as the serial number was originally painted on a yellow field before the black stripes were added around it and lighter South African Air Force Blue has been used for the roundels and fin flash, with B Type roundels painted on the upper surfaces of the wings and C1 Type roundels were more than likely present under the wings. This Roc served on in South Africa towing targets for new fighter squadrons working up and gunners aboard warships in the nearby dockyard until 1944.

**Roc L3187, 771 NAS, RNAS Twatt, Orkneys, 1942**

Roc L3187 is illustrated as it looked whilst serving as a target tug with 771 NAS at RNAS Twatt in the Orkneys in 1942. It wears the same 1941 style camouflage pattern as L3147 but has had its roundels refinished to the later C1 Type with matching fin flash's and the under wing roundels have been deleted. On 28 October 1942 this aircraft nosed over upon landing after its target towing wire became fouled whilst being flown by Lt D R M Manthorpe



© Kjetil Akra 2008



Another nice view of Rocs from 759 NAS in flight, the nearest aircraft coded S having a white lower right wing and engine panels painted in the older scheme where the underside colour carried half way up the fuselage (© BAe Brough)

worldwide, to cater for the needs of a rapidly expanding Royal Navy. Therefore the Rocs were gladly received where they towed targets for ship-board and land based anti-aircraft gunners as well as for training fighter pilots and bomber TAGs. They served in this role from St Merryn in Cornwall to Arbroath in Scotland and from Piarco in Trinidad to Wingfield in South Africa, as well as many other places in between.

Some of these second-line target tugs even flew from aircraft carriers at times and a photograph of such an aircraft which was taken in December 1940 after an unsuccessful landing aboard HMS Formidable at Scapa Flow can be seen in the Public Records Office at Kew (ref ADM207/8). This photo also appears on page 67 of the book 'The Fleet Air Arm in Camera' by Roger Hayward and again helps to disprove the long held belief that the Roc never flew from an aircraft carrier!

As well as flying in the target-tug role other second-line Fleet Air Arm Rocs continued to operate as Gunnery Trainers for new TAGs learning to operate a power-operated turret, just as they had when the type was in front-line service, whilst other Rocs were also used for communications duties carrying personnel and small items of freight such as mail. A lack of spares eventually forced many Rocs out of service from late 1943 onwards, although some did last on until 1945.

As mentioned earlier, the RAF also used the Roc for target towing and other duties but as 2 AACU was really a second-line target facilities unit it really needs to be mentioned here in more



A nice view of a gunner entering the Roc's Boulton Paul Type A Mk.IIR turret using the available foot steps. Note the size of the fuselage A1 Type roundel and the fully lowered dorsal fairing which has the top of the roundel painted onto it (© BAe Brough)

Roc Data

Engine:	890hp Bristol Perseus XII
Armament:	• 4 x .303 Browning machine guns mounted in B.P. Type A Mk IIR turret • 2 x 250lb bombs under both wings • 2 x Light Series Stores Carriers under wings that are capable of carrying • 8 x 20lb Cooper Bombs, flares or other small stores
Speed:	223mph at 10,000ft (sea level 194mph)
Cruise:	135mph (Skua 187mph) (Floatplane- max speed 193mph, at sea level 170mph and cruise 135mph)
Ceiling:	18,000ft (Floatplane 14,600ft) (Skua 19,500ft)
Endurance:	2 hours 30 minutes
All Up Weight:	7,950lbs (seaplane 8,670lbs)
Empty Weight:	6,124lb
Span:	46ft 0in
Span Folded:	15ft 6in
Wing Area:	310 square feet Length- 35ft 7in (seaplane 39ft 4in)
Height:	12ft 1in
Total Number Built	136

detail alongside the other non-operational RAF Roc users.

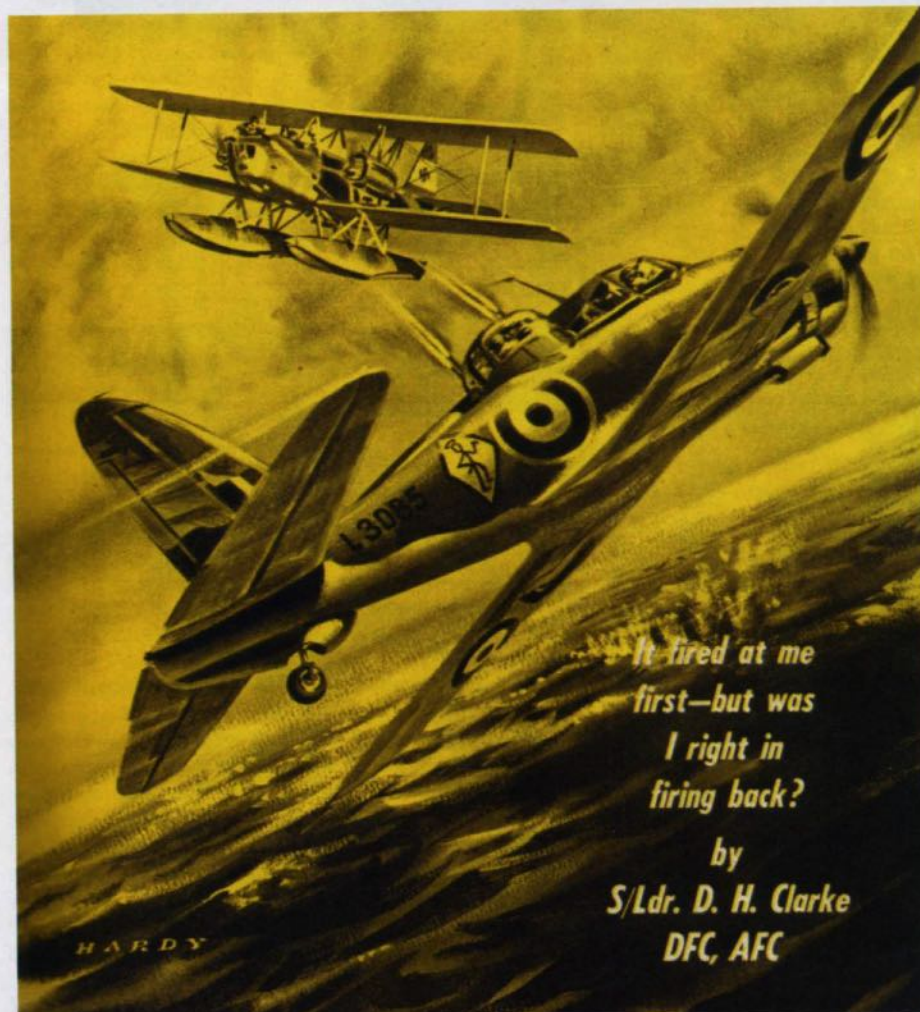
No 2 Anti Aircraft Co-Operation Unit (2 AACU) was headquartered at Gosport alongside its co-located A Flight, with C Flight at Roborough and D Flight at various detached locations such as Eastchurch, Detling or Donibristle. At one time the entire unit had up to twenty-two Rocs on strength along with Fairey Battles and a single Hawker Henley, all of which were used to tow targets over the coastal gunnery ranges for anti-aircraft gunners of the Royal Artillery to keep in practice.

However by 1942, the various AACUs around the country were being disbanded and their detached Flights were renumbered to become independent Flights, thus 2 AACU's old A Flight became 1622 Flight, C Flight became 1623 Flight and D Flight became 1624 Flight, even though they all remained at the same locations doing the same job with the same initial mix of aircraft. Later still in 1943, these flights had become so large that they were again renumbered to become squadrons, but by then most of the Rocs had been withdrawn from service and replaced by faster Defiant target tugs instead.

Two further RAF units also used the Roc in a non-operational role and these were No 1 (Coastal) Operational Training Unit at Sillitoe which used a single example, (L2132), between August and December 1940, (either as a target tug or a turret trainer, it is not clear which), and No 24 Sqn at Hendon also used a single Roc, (L3120), presumably in the communications role.

Conclusion

As can be seen, the Roc was not exactly a war-winning design as its concept was fatally flawed, yet it plodded on doing the best it could and proved vital in the unglamorous yet vital sedentary second line roles before quietly bowing out of service due to lack of spares. No Roc has been ever preserved for posterity and to the men who flew and maintained them this is probably no great shame, but with the release of the new 1/48 scale Special Hobby Roc it can at least be remembered in model form... **MAM**



Lovely artwork by (Wilf?) Hardy which appeared in the September 1961 issue of RAF Flying Review, depicting the combat between the Roc flown by (the then) Pilot Officer Clarke and a German He 59 during the Battle of Britain



THE NEW AIRFIX 1:48 SCALE ENGLISH ELECTRIC CANBERRA B(1)8

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Roc Hard!

Tony O'Toole models the New Special Hobby 1/48 scale Roc

As if Special Hobby have not spoilt Fleet Air Arm modellers enough lately with the release of 1/48 scale models of the Baracuda, Fulmar and Albacore, this Czech company have now followed up their recent Blackburn Skua kit with its stable mate, the Blackburn Roc turret fighter. Just like the real aircraft, both kits are very closely related and share many of the same parts.

Anyone who has built the Skua kit will recognise many of the common parts in the Roc kit straight away, such as the engine, cockpit interior, tailplane and undercarriage, but the fuselage halves, clear parts and most of the wing sections are all new.

Obviously the main difference between the Skua and the Roc is that the Roc was fitted with a power operated turret containing four machine

guns. fully painted box art it is shown in the Temperate Sea Scheme of Dark Slate Grey and Extra Dark Sea Grey, but it could just as easily have been finished in the Temperate Land Scheme of Dark Earth and Dark Green instead. However, what can definitely be determined from b&w photos of the real aircraft is that the underside of its port wing was painted black which had a yellow edged Red/White/Blue roundel on it, so the other wing was possibly white. Anyone who is considering this option might want to check their references carefully for photos as the kit's instructions state the undersides were finished only in Sky Grey.

The other decal options include an overall silver finished L3084, wearing Red/White/Blue and Red/White/Blue/Yellow roundels and a Temperate Sea scheme camouflaged Roc, L3075/L6R of 806 NAS wearing small Red and Blue roundels on its



The wonderful box art painting found on the Special Hobby Roc kit

Although this is a good cross section of Roc schemes which should please most people, I wanted to build a pair of Rocs in two totally different schemes which would entail doing some research before starting the models.

Colour Scheme Research

Inside the well timed and excellent new Mushroom Model 'Blackburn Skua and Roc' by Matthew Willis, there are a number of intriguing shots depicting Rocs and Skuas based at Eastleigh during early 1940, which possibly belong to 759 NAS and have been painted with varying degrees of black distemper and low visibility Red and Blue roundels. I had never seen these photos before and was totally 'blown away' by them so I just had to build one! After approaching Matt about these photos he kindly offered to provide them for inclusion in this article, (for which my thanks and congratulations on such an excellent book, which is full of interesting photos, facts and stories from the men who worked on and flew these aircraft – it is highly recommended reading).

The captions in the book describe these interesting aircraft as being painted overall black but if you look very closely it suddenly becomes evident that they are only black on the undersides as the upper surfaces are lighter with traces of a camouflage pattern visible. There is a definite demarcation line which can be seen running between the two along the side of the fuselage and the leading edges of the wing. On some of the aircraft this demarcation line appears to run from nose to tail at mid fuselage level and on others the black

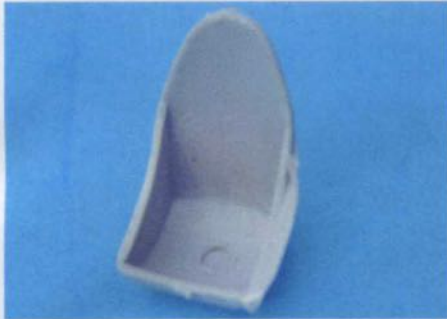
"Anyone who has built the Special Hobby Skua kit will recognise many of the common parts in this kit too..."

guns within a slightly widened fuselage, but there are other more subtle differences too, such as the wings being set with 2 degrees of dihedral and 'straight' wingtips instead of upturned ones like the Skua. The Roc also had a different lower centre section because it had an escape hatch for the turret gunner instead of a recess for a bomb, so the bomb carrying capacity was switched to the wings instead with a pair of bomb racks each capable of carrying a 250lb bomb. Thankfully these bomb racks are included in the kit along with a nicely rendered set of brass etched Light Series Stores Carriers, but for some reason no bombs are provided for either of these!

Decals are provided in the kit for a well known Roc, L3114 coded 'E' of 759 NAS at Eastleigh sporting Red and Blue roundels on the fuselage surrounded by a yellow outer ring. On the beauti-

upper surfaces with Sky Grey sides and undersides and black and white lower wings. Unfortunately the white and black wing lower surfaces are depicted the wrong way around on the instructions – the port wing should in fact be black and the starboard wing white!

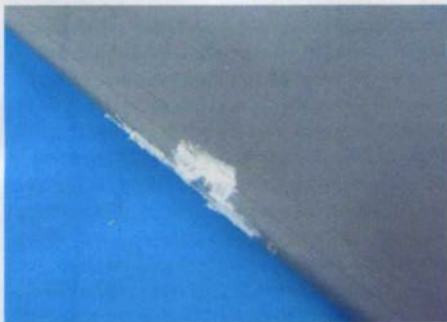
Finally there is Roc R0-143, in the same basic colours as L3075, which was intended for the Finnish Air Force before the Winter War with Russia ended. It wears white discs instead of the full blue Finnish swastika markings in preparation for its ferry flight from Scotland. As mentioned earlier this was done due to fears of being misidentified as German aircraft whilst over Britain and also because the Rocs were due to transit through Sweden en route to Finland and Swedish law prevented any foreign military marked aircraft from doing so!



Just like the Skua kit, some parts need to be cleaned up first, like the seat which has some flash attached and a pour mark in the seat pan that needs to be filled



The finished engine with its air intake trumpets drilled out and painted black to give them added depth



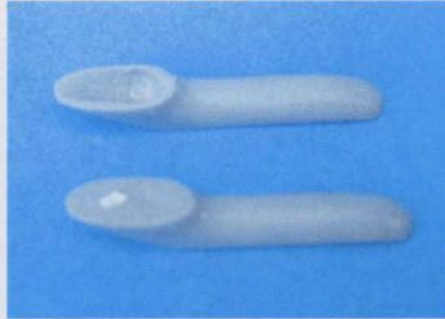
Only very early Skuas and Rocs had landing lights fitted in both wings as that on the right wing was soon faired over, so to replicate this the transparency was fitted to the wing and then covered with filler before sanding it smooth

undersides appear to curve down from the nose to meet the leading edges of the wing and then start again from the trailing edge to meet leading edges of the tailplane.

To me, the most interesting Roc picture from this exciting series of photos was the one which features an overall silver early production Roc wearing its original Red/White/Blue roundels parked alongside another Roc that has black undersides and camouflaged upper surfaces as well as locally modified low visibility Red/Blue roundels, and it was this camouflaged Roc that I chose to replicate in model form.

It would not be the most colourful model in the world as it has no fin flashes, codes or serials, just Red/Blue roundels on the wings and fuselage with Red/White/Blue roundels under the wings, yet despite this, I was 'hooked' because I had never seen a Roc in such a scheme before. But what was the reason for the black camouflage?

I have touched on this in the historical article already, but at the time these photos were taken the only units at Eastleigh equipped with Rocs and Skuas were second line training units including 759 Naval Air Squadron, which was actually the



The exhaust pipe needs to be drilled out and then the resulting hole needs to be cleaned up by sanding to reproduce the hollow look of the original part



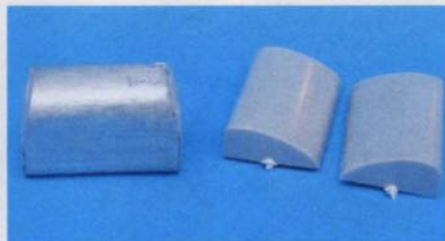
To make the wings stronger the stub sections for the upper wing halves were attached to the outer wing parts using plastic card to strengthen the joint between them and the same method was used with the lower wing halves too, before upper and lower sections were then joined. So that the upper and lower halves would join better the top of the resin wheel wells needed to be sanded along their front edges too



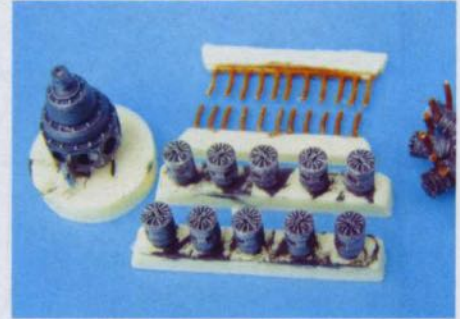
Constituent parts of the kits Boulton Paul gun turret showing the gun barrels provided in the kit and those left over from the a Tamiya Mosquito, which were used on the nocturnal Roc model.

Naval Fighter Pilots School and Fighter Pool squadron.

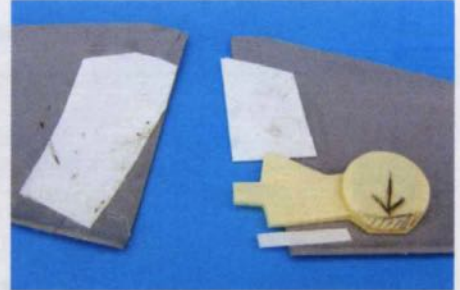
This 'pool' was a holding unit to which newly trained fighter pilots were sent after completing their initial training and where more senior pilots went in between postings so that they could retain their proficiency on fighter aircraft. This meant that as well as the instructors from the fighter school the unit actually had quite a few operationally



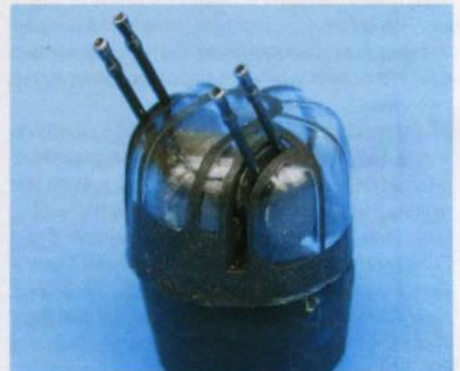
The single fuel tank for each Roc model was constructed using the two largest halves provided in the kit, leaving the other two smaller halves over to be consigned to the spares box. Then the upper corners of this new fuel tank were sanded down to allow them to fit the inner contours of the Roc fuselage



These are the excellent resin parts that constitute the well detailed engine



Another view of the plastic card added to the joint of the wings to strengthen them and also the section of resin removed from the wheel well to allow the wings to join over them



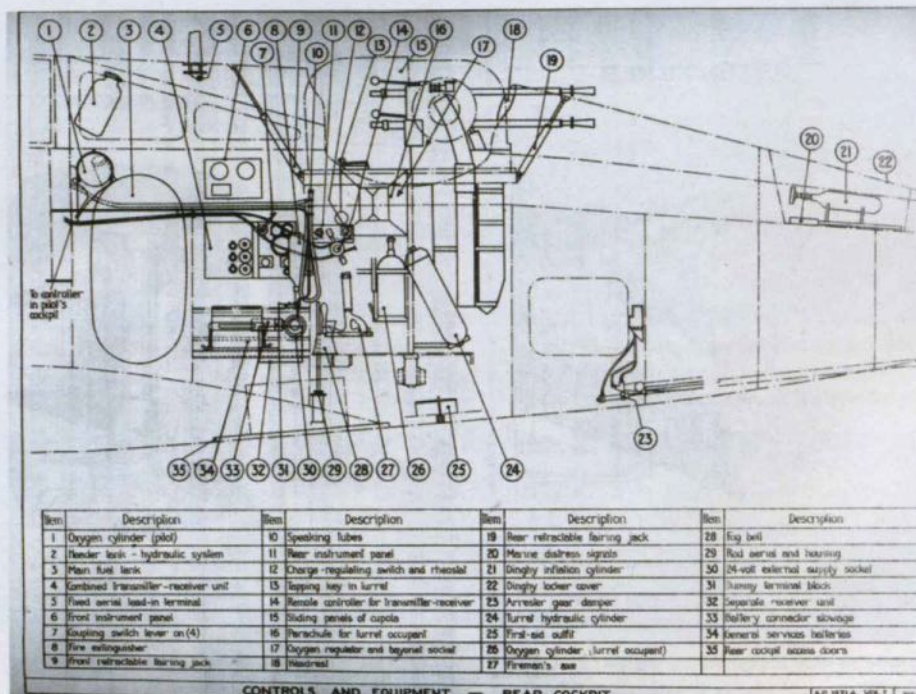
The completed gun turret complete with Tamiya gun barrels which have been drilled out at the end

capable pilots on charge.

As well as its main training role, 759 NAS was also tasked with developing and testing new operational roles for the Roc and Skua, so it might not be beyond the realms of possibility to suppose that the Skuas and Rocs in the photos were being used to test a new operational role at night!

As for the purpose of this nocturnal role, the German night raids on Britain had not yet started in earnest by early 1940 so it is doubtful that they were being used night fighters but there were nightly battles taking place around this time and indeed throughout most of the war, out at sea in the English Channel and North Sea between the MTBs and MGBs of the Royal Navy's Coastal Forces and German S Boats!

It would only be natural for naval fliers to fly in support of their own service so it is possible to suppose that the black painted aircraft could have been operating out over the sea to act as flare droppers to light the area up for search purposes and also during attacks. These were the days before radar was fitted to these small vessels and to back my theory up, some of the black Skuas and Rocs in the photos can be seen fitted with light



The important plans provided by Ian Gazeley which illustrate the layout of the Roc's interior, especially regarding the fuel tank and radio equipment.

series stores carriers, which is how flares were carried. It would no doubt have also been good night flying experience for the pilots in the pool!

Having hopefully provided a credible explanation for the black camouflage all that needs to be determined now was what colour the upper surfaces were.

As the photos were said to have been taken during 1940, these land-based, non-operational naval aircraft, could have had their upper surfaces painted in either the Temperate Land Scheme of Dark Earth and Dark Green or the Temperate Sea Scheme of Extra Dark Sea Grey and Dark Slate Grey, as both were in use.

Most experienced modellers tend to be able to spot various tell tale signs within b&w photos which enable them to make an educated guess at a particular colour scheme, mainly by looking at the contrast between the different colours and knowing what they are supposed to be from colour photos and charts.

As there is not a lot of contrast between the

upper surface colours in these pictures this would tend to rule out the Temperate Land Scheme as Dark Green generally tends to stand out very clearly. However this is very common with the Temperate Sea Scheme, especially when the colours are weathered and washed-out, so I chose to depict this scheme, backed up by the reasoning that if they were being used for operations over



Constructing the interior of the Roc using the layout drawings as a guide



The interior of the Roc almost finished showing the correct layout of the fuel tank and radios. The fuel tank was constructed from the largest halves provided in the kit and the radios are from the spares box whilst the batteries are 1/35th scale ammunition boxes and the oxygen bottles are from an old Spitfire kit with wire used to provide hoses and cables. The parachute is a converted 1/35th ammo pouch and its rack was made from plastic card



The completed interior fully painted

the sea then this would have been the most likely camouflage to use!

Of course this is only an educated guess and under no circumstances can it be taken to be one hundred per cent accurate as a mix of different upper surface colours could also have been worn by different aircraft... who knows!

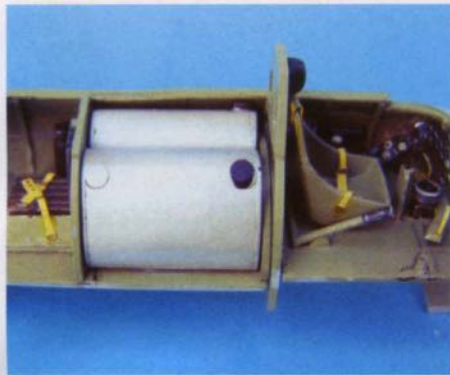
For my other Roc I was on safer ground as I wanted to represent an operational aircraft in standard colours and markings. This Roc was to be 'H' of 801 NAS, in memory of Sub Lt Day and Naval Airman Berry, who flew it during the dive bombing attacks against Boulogne harbour and also the Cap Blanc Nez gun battery when they were both shot down and killed.

Unfortunately the serial number of this Roc is unknown whilst there is no known photograph available of it either and in fact there does not appear to be any photos of Rocs from this period around at all, so a little more educated guesswork would be required for this model!

Thankfully a friend and fellow FAA enthusiast came to the rescue with some rare photos of 801 NAS Skuas from the same time frame, and as both types served alongside each other in squadron service and wore the same camouflage and markings these photos were invaluable, so thanks Ian!

Combining these photos with some other Skua photos that I had, I was able to determine that Roc 'H' would most likely have worn the Temperate Sea Scheme with Sky Grey sides and under surfaces along with black and white halved lower wings during June 1940, and that the fuselage roundels would have been Red/White/Blue with Yellow surrounding rings. Fin stripes would have been applied to the fin with the squadron code letter superimposed over the top in black with a thin white outline. The upper wings would have had Red/Blue roundels and the undersides would have had Red/White/Blue roundels, although the one on the black left hand wing would have had a Yellow ring surrounding it.

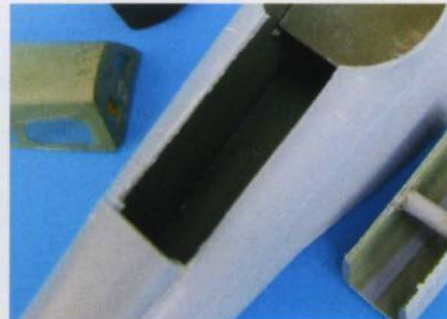
Unfortunately the serial number of this Roc cannot be fully determined because the squadron only recorded aircraft code letters in its documentation, so additional research would have to be carried out to try and find a likely candidate, however now that I knew which schemes both models were to wear and what their potential roles would have been, it was now time to start sticking some parts together at last!



For comparison the interior of the Skua kit, which is how Special Hobby would have you complete the Roc too!



Coming together, the airframe is complete with the engine fitted and the movable fairing for the rear fuselage has been cut away to enable it to be repositioned. Filler has been applied inside the rim of the Townend exhaust ring on the engine cowlings



A close up of the section of fuselage removed to depict the fairing in the lowered position showing how the part has to be reinforced using a piece of scrap plastic. The bulkhead behind the pilot's seat has also had its top section removed so that it can be fully blended into the central cabin glazing.



Another view of the model as it comes together showing the removed section of fuselage which has been reinforced using scrap plastic, the cockpit bulkhead attached to the cabin glazing and the newly modified interior with its cross fitting fuel tank and the radios in position behind



The Turret fitted and the fairing behind it in the lowered position



Quite a bit of filler was used to fair in the cabin glazing so the interior was masked off using paper to prevent too much filler dust from getting in and the windows were protected from being scratched using masking tape

The Build

Many of the pieces in this kit are 'old friends' after building the Skua, such as the interior, undercarriage, engine, propeller and the smaller detail parts, but a new fuselage and wings are included along with new glazing which includes a different central cockpit cover and a one piece cupola for the Boulton Paul turret. Other new parts include a set of rather crude, injection moulded, gun barrels and a well detailed resin turret interior, along with some excellent brass etched Light Series Stores Carriers and sway braces for the pair of resin bomb racks – but no bombs for either are included which is a shame.

Unfortunately Special Hobby have decided to retain the same method of wing construction as their Skua kit by using a separate centre section to which the outer wings are butt-joined. This is such a shame as despite them being mostly new parts the fit is still just as 'problematical' as the Skua. If this has been done to enable common parts to be used on both kits, then this is a strange decision, as the only parts in common are the small upper wing root pieces and even then an entirely new one piece lower wing could still have been provided, which would have made the model so much easier to build. As it is, the separate parts that are provided do not fit together very well and the wing sections need to be reinforced where they meet as they are only very weak butt joints, but having already had a pair of Skuas 'under my belt' I was more than ready to deal with these wings!

As both of the Roc models were built in an almost identical manner it is much easier and quicker to describe the build using just one model, with any differences between the two being mentioned along the way. However upon reaching the painting and decaling stages both models will then

be dealt with separately as they differ greatly at this point.

Interior and Fuselage

The interior of the pilot's cockpit is identical to that of the Special Hobby Skua kit and is quite well detailed with an excellent brass etched seat harness as well as other etched parts such as the instrument panels and a map holder into which I added a paper map, but the pilot's seat has some flash on it which needs to be cut off as well as having a moulding mark in the seat pan which is 'a devil' to remove. On my second model this was cunningly covered up by strategically arranging the seat straps! Some may

detailed diagram of this area from the original Air Publication for the Roc! This diagram has been included in this article as it is a vital reference for anybody building a Roc model. It proves that the Roc had a single fuel tank but the position was actually mounted 'across' the fuselage directly behind the pilot's seat bulkhead, with the radio equipment being situated behind it to form a very cramped radio position for the TAG.

To represent the interior of this section the two largest halves of the kit fuel tanks were joined together to form one single tank that was bigger than a standard Skua tank and then its top corners were 'whittled down' using a craft knife until it

“...a Roc that has black undersides and camouflaged upper surfaces that I chose to model...”

wonder why the control column has a firing button incorporated onto it but this is actually correct because the pilot could still fire the turret guns if they were facing forwards, although hopefully they would be pointing upwards at the time and not straight through the disc of the propeller!

Moving on to the cockpit area behind the pilot's seat, a pair of side-by-side Skua style fuel tanks are provided to fill this space but I vaguely remembered reading some time ago that the Roc only had one tank fitted here and that it was slightly bigger than a standard Skua tank because the extra room was needed for the radios which were moved into this position from the rear fuselage. Initially I thought that this radio equipment may have just taken up the space vacated by one of the removed fuel tanks, leaving the other tank in its original place, but my FAA friend came to my rescue again by answering my plea for help with a

could fit across the cockpit within the interior contours of the fuselage. This tank was then painted silver and glued into place across the floor next to the bulkhead behind the pilot's seat.

In order to make the large radio batteries that can be seen secured to the floor behind the fuel tank, a pair of 1/35 scale ammunition boxes were 'borrowed' from my military spares box and fuse wire was added to opposite corners to represent the electrical leads. These leads then led to various other spares box items and blocks of carved scrap resin which were used to represent the various transmitters, receivers and junction boxes shown in the air publication drawing.

A pair of oxygen tanks were also located inside this small position, a suitable set was found in the spares box from a long since scrapped Spitfire kit. As these oxygen tanks were joined together they needed to be separated using a razor saw before



The line of filler can be seen below the cabin windows after sanding has been completed and the first coat of paints is beginning to be applied as an undercoat to check for any blemishes



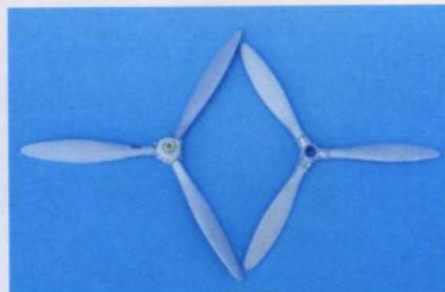
A closer view of the cabin transparency showing the line of filler used to blend it in and the moulded in fuel filler cap removed from the plastic



Painting the nocturnal Roc. Using Humbrols new acrylic colours and various types of paintbrush a Temperate Sea Scheme was added to the night flying Roc along with black undersides. Hannants acrylic thinners were used to thin down the Humbrol paints



Another view of the nocturnal Roc being painted



Because the kit propeller (on the right) is too small, a new one was constructed for the nocturnal Roc using a resin hub left over from a Classic Airframes Fairey Battle and reprofiled blades from a Tamiya Mosquito



After a coat of gloss varnish had been applied the nocturnal Roc received a set of B Type roundels with suitably small red centres from a Modeldecalsheet and a set of A Types were added to the lower wings

being mounted, apart, onto the left hand cockpit wall and a thicker length of wire added in between them to act as a joining oxygen pipe.

Stowed in between these oxygen tanks was the TAG's parachute pack, so a simple mounting bracket was made out of plastic card and the pack itself was reproduced using another 1/35 scale military item in the form of a British Army ammunition pouch which had a loop of red painted fuse wire added to form the ripcord handle. To provide more realism, all of the various radio items were then linked together using more lengths of fuse wire and as an ex-Army radio operator myself, I could not resist adding a Morse key made out of a piece of plastic rod with a knob of PVA Glue added to the end of it which was then mounted onto a piece of plastic card and connected to the radio using yet more fuse wire. I cannot help wondering that it must have been a feat of gymnastics for the TAG to leave the turret and get into this very cramped radio position whilst wearing flying kit!

Most of the interior was finished using Humbrol Acrylic 78 Interior Grey Green, apart from the instrument panels and detail parts such as radios and side wall attachments which were painted black. The seat straps were painted using Humbrol 71 Oak but scraped away over the buckles to reveal the brass underneath. All areas were dry brushed using silver and white to highlight the detail and a light watercolour wash was applied to further enhance the detail.

With the cockpits finally complete they could be inserted into the fuselage and the halves could be closed together to be left to one side for the glue to dry.

Engine and Wings

The superbly moulded resin Bristol Perseus engine was assembled next. It consists of nine individual

cylinders and eighteen exhaust pipes with a central engine block. The first job was to pre-paint the cylinders and engine block using Humbrol Acrylic 33 Matt Black and the exhaust pipes were also painted but with Humbrol enamel 55 Bronze, after which all the parts were dry brushed with silver to highlight the detail.

Although the engine is not mounted on an individual resin block, the rest of the engine parts are, so they have to be individually removed using a razor saw which was an exceedingly boring task – even though it only took 20 minutes or so to remove them all. Thankfully these cylinders then slotted perfectly into the main engine block with hardly any need for glue to keep them in place – but then each has to have a pair of resin exhaust pipes added to them which is an even more tedious job to accomplish as they also need to be removed from their resin base! Nevertheless it is well worth it in the end as the finished engine looks fabulous and even better once the plastic cowlings have been built up as it fits over the engine like a glove without having to trim any of the resin parts, unlike many other kits of this nature.

The only problem with the plastic cowlings is that the separate insert that forms the interior of the Townend exhaust ring is a terrible fit which means that quite a bit of filler needs to be applied along the inside edges of the cowlings front to cover the gap inside.

Once this was done and sanded smooth the locating hole in the fuselage was enlarged to allow the large resin plug at the back of the engine to fit into it and the cowlings were test fitted over the engine so that the triangular shaped framework could be attached. Two air intake trumpets also need to be fitted in between the engine cylinders at this stage too, but to add more realism, their fronts were drilled out and after being painted

Brick Red using Humbrol 70, a touch of black was added to the drilled out sections to give them added depth.

In a similar manner the end of the main exhaust pipe was also drilled out and sanded to shape to make it appear hollow too and it was painted using Humbrol Bronze to match the Townend Ring on the front of the engine cowlings. This was then left aside until after the main paintwork was complete but the one from the 801 NAS Roc disappeared in the meantime and had to be replaced by another taken from a built-up Lysander kit, only to re-appear on my desk after the photographs for this article were taken – I'm sure we've got a Gremlin or a practical joker ghost in our house!

With the fuselage and engine completed the wings were tackled next and unlike my earlier Skua models where I had experimented with different ways of attaching the wings, this time both models had their wings constructed in exactly the same way. Before sticking any parts together however the first job was to sand all of the parts down like a vacuum kit to make the mating surfaces nice and flat and also to make the trailing edges a bit sharper.

Instead of assembling the outer wings and centre section separately and then butt joining them together as per the instructions, I elected to use a different method which would result in the wings being much stronger. In order to do this the first job was to add tabs of plastic card to the joints of the one piece lower centre section part and the upper wing halves of the outer wing sections were similarly treated too. Once the glue on these tabs was dry, they were used to join the three lower wing parts together to form a nice strong one piece lower wing section and the upper wing halves were also joined in a similar manner to form a pair of one piece upper wing sections,

which if you have followed what I'm saying is how the kit should ideally have been provided in the first place!

Before these upper and lower wing halves could be joined together the resin wheel well inserts need to be inserted but they have to be trimmed slightly at the front to allow the upper wing half to curve over the top of them. Once this had been done using a sharp knife and some wet & dry, the upper and under sections of the wing could now be attached to each other and the whole wing assembly was then held together using tape and left aside for the glue to fully cure.

I just wish that Special Hobby had provided an entire lower wing section as one single part with one piece upper wing halves for each side, as I cannot see the reason for breaking the parts down in the way they have, unless they were originally considering a wing fold. In the end, the only wing parts that are common to both kits are the upper wing centre section stubs. That's the way they have chosen to do it so we will have to live with it, however it does make the kit harder to build which may put some people off and that is a shame!

Keeping with the wings, another alteration was to blank off the right hand landing light as only the first few Rocs had two lights fitted. To do this the holes in both wings were made bigger, to accept the kit's transparencies, and then the starboard part was fitted using superglue to keep it firmly in place, then covered with filler, and eventually sanded smooth to represent the metal cover applied to the original aircraft. The hole in the port wing was lined with thin plastic card and painted Interior Grey Green. A landing light is not provided in the kit so one was made from a section of circular clear scrap plastic which was painted silver on the rear with three curved lines painted on the front in black to recreate the struts which hold the bulb. The transparent cover was attached over it and covered with masking tape to prevent it from being damaged.

Turret

This really is a nice bit of model engineering and consists of six resin, six plastic, one clear and eight etched brass parts and the end result looks really effective – apart from the provision of plastic gun barrels instead of resin ones which does let the side down somewhat! I elected to replace these kit guns on the nocturnal 759 NAS model with a set of gun barrels left over from the nose of a Tamiya Mosquito kit which do look much better but as I had only one set of these the 801 NAS aircraft had to make do with the kit items after they had been thinned down. Both sets of guns were made to look more realistic by having their ends drilled out to make them appear hollow.

All of the turret parts were painted matt black

apart from the seat, which was only a webbing strap on the real aircraft, and the brass etched lap belt was finished as per the pilot's harness using Humbrol Oak. The frame lines on the clear turret cupola were also painted black and this part was then fitted over the top of the turret interior so that the guns could be fitted from the outside and finish the turret off.

Overall this is an excellent representation but the detailed interior can hardly be seen from outside through the turret glazing so maybe some cottage industry manufacturer such as Aeroclub will come to the rescue with a much thinner vacuum formed turret cupola which could have the sliding doors opened up to show off more of the interior?

To allow the turret to rotate on the real aircraft without snagging the airframe, there were moveable fairings in the roof of the canopy and in the rear fuselage, and because the fuselage fairing was often locked in the downward position, I decided to replicate this on the nocturnally painted 759 NAS model by removing this section from the fuselage using a razor saw, and simply repositioning it in the 'down' position.

Main Airframe Assembly

Now that the wings and fuselage were fully assembled, the next thing to do was to stick them together and add the tailplane. Although some

fairing! In the end a new one was made from scrap plastic instead and after both models had been painted a length of elastic thread was attached, which ran along the side of the fuselage from here to the cockpit, in order to represent the parachute release cable! A bit 'Heath Robinson'ish' but perfectly true and strips of painted Tamiya tape were used to represent the doped on fabric strips which helped keep this cable in place.

As the central part of the cockpit canopy needs some filler to smoothly fair it into the contours of the fuselage, this part was added next and the gun turret was temporarily fitted to make sure that it was located in the right place.

The sliding pilot's canopy was also dry fitted for the same reason and whilst this was temporarily in position, the windscreen was also lined up and attached too. On all the Roc photos that I have seen there only appears to be a single fuel filler cap which is on the left hand side just behind the pilot's cockpit, but due to its Skua lineage and the fact that a pair of fuel tanks were mistakenly provided, the Special Hobby Roc kit has a filler cap positioned on either side of the fuselage, so, whilst sanding away the excess filler from around the canopy the filler cap on the right hand side was also sanded away too.

After this, the engine nacelle was slipped on over the resin engine and glued into place and it

"...the Roc only had one fuselage tank fitted, which was slightly bigger than the Skua's..."

filler was needed to cover the main seam lines, the wing to fuselage fit was not too bad and the 2 degree dihedral of the Roc's wings was maintained by using Tamiya tape along with a few stacked books until the glue had cured. The fit of the tail was not so good and quite a bit of filler was needed to cover the gaps along the top and bottom joints whilst more filler was also required on the bottom of the fuselage to cover the gaps present around the arrester hook mounting.

I don't know whether it was just me not being very observant, but I could not find the triangular piece that is shown, (but not numbered), on the instructions which fits on top of the tail parachute

was time to attach the propeller. However, just like the Skua kit, I found the blades on the kit propeller to be too short and broad whilst the hub was totally devoid of detail, so the propeller of each model was replaced – but in two different ways.

For the 759 NAS Roc with the black undersides, a similar method to the one used in my previous Skua article was undertaken, by removing a set of narrow blades left over from a Tamiya Mosquito kit and re-profiling them using a file and wet and dry so that they appeared to turn in the opposite direction before adding them to a more detailed hub.

As I did not have any more spare Aeroclub propellers available to use, the hub came from a nicely detailed resin hub that had been left over from a Classic Airframes' Fairey Battle and was used instead.

For the 801 NAS model a totally different and much lazier approach was used, and instead of cutting bits of propeller about and filing them to shape, a larger white metal Hamilton Standard two position 13' 6" diameter, right hand turning propeller, designed for a 1/48 scale Sunderland, coded P429, was ordered from Aeroclub to see if



The kits bomb racks and Light Stores Carriers, made mostly from brass etch



Two views of the bomb racks for 250lb bombs and Light Series Carriers for smaller items which might help when building up the kit items, as fitted to the Hawker Hind at Cosford.





Unidentified Roc, 759 NAS, Eastleigh, early 1940

As already described this aircraft had black undersides and most likely had the Temperate Sea scheme of Dark Slate Grey and Extra Dark Sea on its upper surfaces, so, using the photograph of this aircraft as a guide, a sketch was made of the camouflage pattern which could then be used as a plan when applying the paint.

First to be painted were the upper surfaces and as I had decided to try out Humbrol's new range of acrylic paints on these models, this one received three coats of their 224 Dark Slate Grey which was thinned with tap water and applied using a wide flat brush. The disruptive pattern of Humbrol Acrylic 123 Extra Dark Sea Grey was applied next, and last of all Humbrol Acrylic 33 Matt Black was brushed on to the undersides, with nice straight lines being achieved along the wing and tail leading edges using masking tape. As already mentioned the only exception to using

the new acrylic paints here was the propeller spinner which was finished using Humbrol enamel 19 Bright Red.

It would appear that most of the mainstream model paint manufacturers are now introducing their own ranges of acrylic paints but most seem to be designed with the airbrush in mind and are often hard to apply by hand using a paintbrush. However this new range from Humbrol can be applied by paintbrush... but only if it is thinned with tap water, otherwise it is quite thick and tends to dry as soon as it is applied, resulting in brush marks and thick paint everywhere.

I have found that three or four thinned coats achieve just the same coverage as one or two thick coats and looks much better, especially after a quick skim over with a fine sanding stick in between coats! Even so, the resulting finish still appeared to be a bit rough to the touch, but this was probably due to the paint being so matt as,

after a coat of enamel gloss varnish was applied, this disappeared altogether to result in a nice smooth model which was ready to accept decals!

Unlike most models I build, this one only needed a grand total of six decals which were all roundels, but they would still be difficult to find as the Red/Blue roundels of the Roc being modelled were non standard with rather small red centres. Luckily I have a rather large spares box of decals and four suitable roundels were eventually found along with a pair of Red/White/Blue types for under the wings. These were applied and sealed under another coat of gloss varnish, without the need for any decal fixing products.

If you cannot find any suitable decals and are *au fait* with cutting out circles, then Hannants sell sheets of Dull Blue and Dull Red decal sheets which would be ideal for making your own roundels.



Roc L3145 'H' of 801 NAS...

flown by Sub Lieutenant Day and Naval Airman Berry, 20 June 1940 over Cap Blanc Nez, France

Thankfully this model is much more colourful as it has codes, fin flashes and brighter paintwork. As already mentioned this Roc was flown during the dive bombing attack against a German gun battery at Cap Blanc Nez near Calais in Northern France on 20 June 1940 and was chosen to commemorate both of its crew members who were killed when it crashed into the sea due to flak damage. Although the individual aircraft letter is known, unfortunately there is no record of the actual serial number, so a trawl through the list of Blackburn Roc serials came up with a few likely candidates and the most probable one was L3145, so this was chosen.

The colour scheme was again applied using Humbrol acrylics where possible, but first of all the underneath of the right wing was sprayed

white using a can of Tamiya spray paint. After about four thin coats a nice coverage had been achieved so masking tape was applied ready to paint the left wing black using Humbrol acrylic 33 Matt Black using a paintbrush. Once this had been done, both wings were then masked off using even more tape ready to apply the rest of the colours.

Just like my recent Skua model, the fin, tail and lower fuselage of this Roc was painted Sky Grey, and White Ensigns enamel Sky Grey was used because as far as I know this is the only paint of this colour currently available, (apart from Tamiya which is hard to brush paint), whilst the upper surfaces were applied in the same manner as the other Roc using Humbrol Acrylic 224 Dark Slate Grey and 123 Extra Dark Sea Grey.

All of these colours were applied freehand using a wide flat brush although a smaller finer brush was also used for more delicate areas such

as the canopy frames as I absolutely detest having to mask these off.

To make the decals easier to apply, Humbrol 35 Gloss Varnish was brushed on, and whilst this was drying, the decals were selected. Most of these came from the excellent decal sheet provided with the Warrior Model 1/48 scale resin Roc kit, although the serial number came from Xtradecal set X02148 for World War Two style black serial numbers and the black and white individual aircraft letter 'H' was made up from a pair of black and white letter 'F's from the decals in the Special Hobby Skua kit.

This time Micro set was required for some of the decals, to prevent them from silvering, and a further coat of gloss varnish was applied to help seal them into place.



Adding the spin recovery parachute chord which runs along the side of the fuselage from the cockpit to the tail, made from elastic thread held on with strips of masking tape with a small section of plastic card forming the roof of the parachute housing. To create the silver frame line in the roof of the pilots sliding canopy a piece of silver decal was used

it was suitable. Thankfully when it arrived it was found to be perfect... phew!

Both (different) propellers were cleaned up and painted using Humbrol Acrylic 166 Light Aircraft Grey for the front of the blades and 33 Black for the rear, whilst the hubs were painted silver. To keep 'the health and safety man happy', a yellow tip was added to the back of each blade and the spinner on the 759 NAS Roc was painted gloss red whilst the one on the 801 NAS model was matt black.

Now that the model was almost complete, the seam lines were given 'a going over' with wet & dry to smooth them down, using sanding sticks to get into those awkward areas that every model has, and then it was washed to remove all the dust. Whilst the model was left to dry, the under-

To add to the weathering effect, Mig Pigment Powders were used to represent the prominent exhaust streak normally found along the right hand side of the fuselage and below the wing, but because both of these mediums have a tendency to wear off over the years, they had to be sealed into place – using a can of Warhammer spray varnish. They will streak if the varnish is applied by paintbrush. I find that this satin varnish gives a model an almost 'toy like' appearance, so more Polly Scale Flat varnish was applied to cover it, using a wide flat brush for the first couple of coats in order to achieve the required matt finish and then an old lightly loaded brush was used for the last coat as it is applied in a scrubbing fashion in order to hide any brush marks.

Most of the smaller pieces that would other-

"...the Roc kit's propeller blades were too short and broad whilst the hub was totally devoid of detail..."

carriage parts were assembled and painted, but left off for the time being as I did not want them to get damaged when it came to applying and removing the rather messy watercolour wash after the model had been painted.

Painting and Decalling

That leads us nicely into the painting stage, but as both models start to differ immensely from here they will be dealt with separately until the end of the decaling stage.

Finishing Touches to both models

Both models can now be described together once more as they were finished off in almost the same way but where differences occur, such as with the armament they will again be described separately;

Like most of my models, a coat of Polly Scale Flat varnish was applied over the glossy paintwork to dull it down, and this also has the effect of giving the subsequent watercolour wash more 'grip' to help it to stay tight inside the recessed detail.

This wash was made up from a watery mixture of Lamp Black, Payne's Grey and Burnt Umber, and was brushed over the model and left to almost until it dried, before being wiped away using a moist piece of paper towel. This left enough paint behind inside the panel lines to highlight them and make the paintwork look slightly worn.

wise have been broken off the model during the messy process of removing the watercolour wash with a cloth or paper towel, can be added to the model now, and this included the undercarriage, exhaust pipe, radio mast and pitot tube, as well as the etched foot hold, which by the way has the wrong number on the instructions!

As mentioned already, the parachute release cable was attached to run along the side of the fuselage and more was also used to rig the radio antenna whilst a new pitot tube was applied to the 759 NAS model, as the tip of its pitot tube snapped off and was lost to 'the carpet monster'!



The Dunkirk Roc having the black walkways applied to its glossy paintwork after the decals have been applied

As some Rocs had a different style of pitot fitted the opportunity was taken to model one of these – made up from a section of metal tubing from a Revell Contacta glue gun with a small piece of copper wire fixed into the end of it.

Upon fitting the undercarriage, all the undercarriage doors were found to be too long, so both the main doors, and the smaller ones that cover the retraction struts, were cut down bit-by-bit until they fitted better and the undercarriage itself was fixed so that it leaned back and remained vertical when all three wheels were touching the ground, a common but sometimes overlooked trait of the Skua and Roc.

That just left the excellent resin and etched metal bomb racks and the equally impressive etched Light Stores Carriers to fit under the wings and the basic model was finished. However because the 801 NAS Roc model was representing an aircraft that had been lost whilst undertaking a dive bombing sortie, I decided to arm it with bombs, so a set of 250lb bombs, from a Tamiya



The Finished Dunkirk Roc – WW1 style 20lb Cooper (or Couper) bombs from an Eduard Sopwith Camel kit have been added to the Light Series Carriers whilst each bomb rack contains a 250lb bomb from a Tamiya Swordfish to represent the load carried during dive bombing attacks against Boulogne harbour and the gun battery at Cap Blanc Nez in 1940

Swordfish, were fitted to the main bomb racks after the grooves in the tops had been filled and eight 20lb Cooper, (also known as Coupar), bombs from an Eduard Sopwith Camel kit were attached to the Light Stores Carriers, (although they are also available in white metal from Aeroclub with four per pack).

It seems strange that these World War One vintage weapons were still in use with the Royal Navy during the early period of World War Two, but they were commonly carried by Skuas and Rocs. Just for the record, the 250lb bombs on the model were painted using Mid Stone with a bit more yellow added, whilst the Cooper bombs were black with silver caps, but these colours are only an approximate guess!

With the armament fitted, both models were now finished and I was immensely happy with the result. There are some problems with the Special Hobby kit, such as the wings and the propeller, not to mention the incorrect interior, but none of them are insurmountable problems, and I would like to take this opportunity to congratulate this company for releasing such an oddball subject that no other manufacturer would ever have the courage to release. My thanks also to Matt Willis and Ian Gazeley for their help, and I humbly dedicate this article to anybody who was brave enough to go to war in a Roc! **MAN**

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Kiwi 'Scooter'

Sam Hall modifies the old 1/72 scale Hasegawa A-4E/F into a Royal New Zealand Air Force A-4K



The A-4 Skyhawk has always been a favourite type of mine. Living in New Zealand it was our 'local fast jet', and always the first page turned to in any reference book when I was a child – (and still is in fact!). Although modelling on and off since childhood, I only turned my attention to the 'Douglas' fairly recently, mainly due to it being fairly difficult to find appropriate decals for RNZAF aircraft. The traditional USN Gull Gray and white or Aggressor schemes never really caught my imagination like the local flavour did!

In the mid-1960s the RNZAF was looking for an attack aircraft to replace its Canberra B(I).12s and Vampire FB.5s. A variety of aircraft were considered for the role including the F-4C, F-5, F-111, Mirage IIIO, A-7, F-104G and the A-4 Skyhawk. While the RNZAF preference was for the F-4, economics and politics, as well as the reputation the aircraft was then establishing in the Vietnam conflict, saw the smaller A-4 selected.

Fourteen, (ten single-seaters and four trainers), were delivered to New Zealand by sea in 1970, equipping mainly No 75 Squadron, replacing the de Havilland Vampire FB.5, with some aircraft going to No 14 Squadron, (previously on the Canberra), to be operated alongside Vampire T.11s in a training role; both squadrons being based at RNZAF Ohakea in the North Island of New Zealand. After the Vampires were replaced by the BAC Strikemaster in 1972 all the A-4s were assigned to 75 Squadron.

The RNZAF A-4s were designated as A-4Ks. They were essentially A-4Fs with modifications specific to the RNZAF. The most obvious was the larger, 'squared-off' fin of the A-4H and M. Also fitted was a braking parachute, as these A-4s were to be exclusively land-based. A VHF blade

aerial appeared on top of the 'hump', which was empty. The avionics normally fitted in the space were not bought for the RNZAF. There may have been some intention to do so at a later date but this never materialised. In the meantime they provided useful baggage space for deployments overseas!

After consideration to replace the A-4 in the early 1980s, a decision was made to retain and upgrade the aircraft. In 1984 the surviving Royal Australian Navy fleet of ten A-4Gs, (also based on the A-4F), was purchased by the RNZAF, increasing the fleet number to twenty-two aircraft, two of the original fourteen having crashed by this time. No 2 Squadron was reformed to operate the new arrivals.

In the late 1980s, the collective fleet was upgraded to 'Kahu' standard. This involved, amongst other things, the fitment/shoehorning of an APG-66 radar into the nose, installation of a 'glass' cockpit, HOTAS systems and HUD, and provision for the use of Laser Guided Bombs, AGM-65 Mavericks, and the more capable AIM-9L Sidewinder, replacing the AIM-9G previously

used. The empty avionics hump was removed.

In 'Kahu' form, the A-4K was a potent attack aircraft for the RNZAF throughout the 1990s. Replacement by twenty-eight F-16s was scheduled for mid 2000, but a change of government saw the F-16s cancelled, and the Air Combat Wing, (Nos 75, 14 and 2 Sqns), disbanded entirely in December 2001. At the time of writing the seventeen surviving 'Kahus' are in storage at RNZAF Woodbourne in the South Island, awaiting confirmation of sale. For four of the ex A-4Gs, sale will mean a fourth operator, having served with the USN, (including Vietnam operations with VA-155 aboard USS Ranger), prior to sale to the RAN.

As delivered, the original fourteen A-4Ks, (serials NZ6201-10 and 6251-54), wore the then current SEA TO 1.1.4 'tan and greens' colour scheme as used by the USAF in Vietnam. In the mid-80s, the tan was replaced by dark grey, the markings toned down, and the camouflage 'wrapped around' as the upgrade approached. In the late 1990s the scheme changed again to all-over dark green, with the markings being further toned down to black outlines and numerals only. This was the final scheme for the RNZAF A-4. Initially the RAN A-4s, (NZ6211-18 and 6255-56), kept their original Gull Gray and white, but were later repainted in camouflage in RNZAF service.

The subject of my model, NZ6203 was destroyed in June 1996, in a crash near Ohakea after engine failure due to oil starvation, believed to be caused by fatigue failure of an oil feed pipe. The pilot ejected safely. The considerably shortened J52 engine was recovered and was on display at the Ohakea Base museum prior to its closure in June 2007. In addition, other recovered bits and pieces were sold as paperweights in the



Boxtop

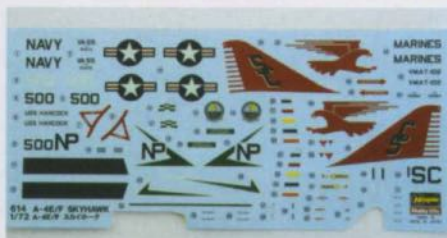
museum shop! Because of this I actually have a piece of this aircraft, a section of frame from the nose, although I still haven't figured out what to do with it. Currently it guards my modelling bench!

The kit

This Hasegawa 1/72 A-4E/F (kit B9) is an older Hasegawa mould dating from the 1960s and is based upon the old FROG kit I understand. You get 70 pieces moulded in light grey plastic, plus a clear canopy. There is a small amount of flash, and mould lines are present on parts like the undercarriage. It is 'Matchbox-level basic', but without the trenches, (actually the surface detail on the Matchbox A-4M is superior in places – sounds like heresy but it is true!).

Detail, where present, is fine raised lines – a lot of surface detail is simply not present. The shape is OK except for the nose forward of the cockpit, which is too big and too round. Leading edge slats are moulded closed, with the rear fuselage airbrakes moulded separately. The main undercarriage bays have an 'attempt' at ribbing, but it is very inaccurate. I'm not a tape measure type, but I understand the kit is slightly over scale, rumour having it that when it was measured for length the mould makers used measurements from a TA-4 trainer, which being longer than the single-seater, resulted in an overall 'stretch' to the dimensions and proportions of the kit.

This kit predates the 'thou shalt buy our accessory sets as well' Hasegawa era, so a full set of underwing weaponry is provided in the



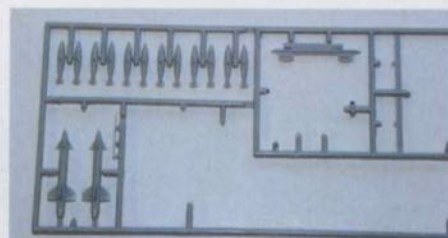
Kit decal sheet minus the cockpit decals

tanks and one (possibly) 150 gallon centreline tank, (it's hard to be sure; it is definitely smaller than the wing tanks, but doesn't look small enough), are included and these aren't too bad, even if the pylon is moulded on one half of the centreline tank. The other pylons have shape and depth problems. The avionics 'hump' is an optional part, although both decal options included in the kit are for humped A-4s.

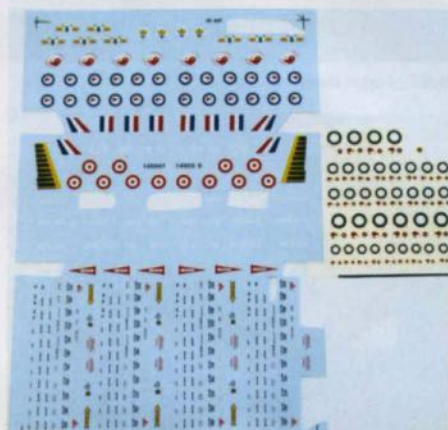
The 'hump' shape is not quite right in that it has a rounded cross section when viewed from ahead, instead of the slightly squared-off shape on the real aircraft. The cooling intake on the top side of the 'hump' is also absent. Both straight and cranked IFR probes are included. The detail on the straight one is very poor. The decal sheet is colourful, with options for either a US Navy VA-55 aircraft, or VMAT-102 of the US Marines. Since I didn't use the kit decals I won't attempt to vouch for their accuracy.

Construction

I started assembly with the wings. The wing is moulded in three pieces – a complete underside



Not very detailed stores



Superscale decal sheet with Flying Kiwis alongside

with port and starboard topside halves. Before putting these together, I cut the leading edge slats away. The slats on the A-4 are not hydraulic, and retract due to airflow. Unless locked closed by groundcrew, their natural position at rest is down. (Blue Angels A-4s are the exception to this, having their slats permanently locked up to remove the danger of asymmetric slat deploy-

"In the late 1980s, the fleet was upgraded to 'Kahu' standard with APG-66 radar and a 'glass' cockpit..."

form of a full set of twelve Mk 82 500lb and two Mk 83 1000lb 'slick' bombs, (at least, that is what I think they are, as they are a bit shapeless), plus one Multiple and two Triple Ejector Racks to hang them from. The shape on the racks is a bit vague, and detail is non-existent. Two

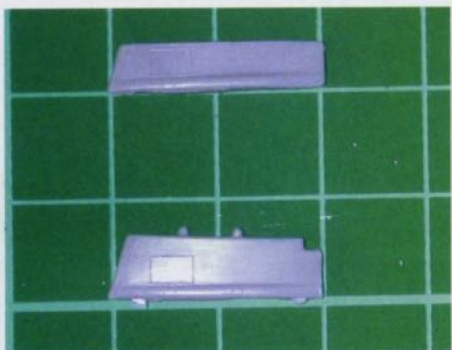
AGM-12B Bullpups and two AGM-45 Shrikes are also included; again they are on 'the fuzzy side of accurate', with awkwardly placed mould ejector marks. Launch rails for the missiles are not included, so if you want to add them you will have to buy an accessory set anyway, or make your own. Two 300 gallon wing



Various painting guides

ment causing control problems during close formation work). I have seen pictures of A-4Ks on the ground with the slats closed, but to me an A-4 just looks wrong that way, so the slats were coming down.

I cleaned up the wings and 'boxed-in' the gaps with .020 Evergreen plastic sheet cut to size. With the addition of half an ounce of lead fishing weights to the forward part of the wing centre section interior, to prevent a 'tail-sitter', (in 1/72 there aren't many places to weight an A-4, so cram it in wherever you can!), the



Modified pylon above

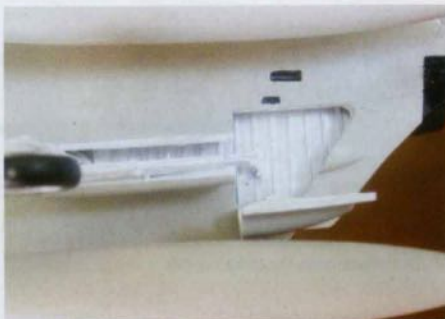


Roundel comparison between Superscale and kit decals

wing was finished, at least for the time being, and put aside.

Moving to the fuselage, the cockpit was assembled. This is basic, a seat, control column and instrument panel combining with a floorpan that includes the side consoles as well as the nosewheel bay. I used the instrument panel decals provided and installed the pilot figure to hide the lack of detail and fill the space. Not much would be visible anyway due to the size of the cockpit in this scale. The interior was painted Tamiya XF-54 Dark Sea Grey.

Before I assembled the fuselage, I had to modify the fin. The A-4K has a square tipped fin, rather than the curved style of earlier models. To achieve this, I cut off the forward part of the fin tip between the rudder and the uppermost panel line. This is made easier by the fin being moulded in one piece with the left hand fuselage half. The resulting notch was replaced by a piece of .040 plastic sheet cut to size, then sanded to blend in. The top of the rudder was also flattened



Basic undercarriage bay detail

to eliminate the curve on this piece, resulting in a square tipped tail.

I glued the airbrakes 'shut', and then had to fill the resulting huge gaps, as they are really designed to be assembled in the 'open' position, and don't fit very well. I used the cranked refuelling probe, (A-4Ks were delivered with straight probes, then retrofitted with cranked ones in the mid-1970s), and inevitably broke it off three times during finishing and painting!

A braking parachute fairing was fashioned from the unused forward fin fillet provided, (the bit covered by the aft section of the hump), with a piece of sprue ejector serving as the endcap. I wound up scratchbuilding the arrester hook assembly from the unused straight refuelling probe and plastic card, after losing the original during assembly, (either to the carpet monster, or the bin via an abundance of used masking tape discarded during the build!). I think my hook is slightly more accurate in outline, although I couldn't duplicate some of the curves required.

Assembly is straightforward, and fit was generally pretty good. There isn't a lot to it, the Skyhawk being a fairly small and uncomplicated airframe, (its planform will fit entirely inside that of a MiG-25 or F-14 for example!). The 'hump' was moulded slightly asymmetrically, resulting in a gap along the left hand front where it meets the fuselage behind the cockpit. At the front of the wing there is a step where it meets the underside of the forward fuselage, and there is a gap where the rear of the wing meets the fuselage also.

As the wing root cannon are moulded integrally with the wings, careful sanding is required to eliminate the step.

The nosewheel bay is only three sided, and does not extend as far aft as it should, meaning that once installed you can see into the fuselage both vertically and horizontally. I boxed this in with plastic sheet.

Typically for a kit of this age, there is no intake trunking, the intakes just attaching to boxed-in recesses on the sides of the fuselage. Given the size of the intakes, there isn't much to see anyway. Intake fit was good, with not much cleanup required. There is no real attempt at a jetpipe; the ends of the fuselage meet to prevent see-through, and a short cylinder is attached to represent the external portion of the engine exhaust.

The canopy is a poor fit, needing some careful filling and sanding to blend in around the rear. This is made more difficult by the canopy frame being moulded as part of the fuselage, which leaves no room for error when filling or sanding. The outer wing pylons need reshaping, as they are too deep and have a step not present on the real thing. I removed the stepped portion, but the proportions are still not quite right. The inboard pylons are also too deep.

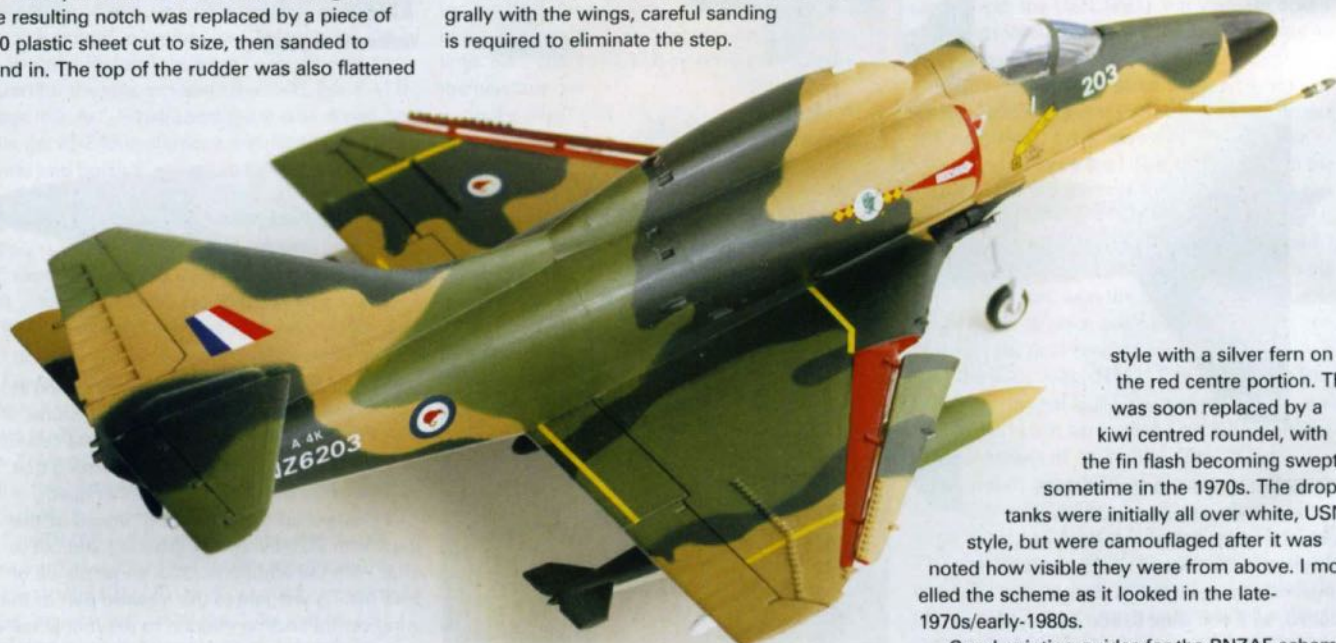
The rest of the airframe required no more seam removal than average – not perfect, but not terrible either, and I haven't managed to build anything yet that didn't require filler somewhere.

Painting and decalling

For nostalgia reasons I went for a variant of the initial SEA scheme. The basic scheme was unchanged during its existence, but details changed over the years. As delivered, the fin flash was straight, and the roundels were RAF



Nose to nose with Italeri



style with a silver fern on the red centre portion. This was soon replaced by a kiwi centred roundel, with the fin flash becoming swept sometime in the 1970s. The drop tanks were initially all over white, USN style, but were camouflaged after it was noted how visible they were from above. I modelled the scheme as it looked in the late-1970s/early-1980s.

Good painting guides for the RNZAF scheme aren't that common. I used the Gekko Graphics

guide issued with their 1/48 scale RNZAF and RAN decal sheets, and the guide from the Hasegawa 1/48 A-4K release, as well as any photos I could lay my eyes on.

I started the painting with Tamiya fine surface primer, followed by Tamiya 'rattlecans' for the camouflage, AS-13 Green, AS-14 Olive Green, AS-15 Tan, and AS-16 Light Grey, using Blu-Tack rolls and masking tape for the demarcations. Until I tried it, I hadn't realised how tricky a scheme it is to mask. Getting the Blu-Tack into the areas below the air intakes was particularly difficult. Several coats later, once all the overspray had been retouched, (and retouched!), it was time for the detail painting.

The slat undersides and recesses, along with the intake lips were brush painted with Xtracolor X103 enamel Insignia Red, (the intake splitter plates should also be red, but I didn't notice this until the model was completed, and didn't feel like engaging in a modelling version of trench warfare to correct any errors that were bound to result due to the red bordering the white intake interior, so I left it alone. I can live with it!).

The undercarriage and wheel bays were brush painted with Tamiya X-1 acrylic Gloss White, with the tyres in Gunze Sangyo H77 Tyre Black, and the radome Tamiya X-18 acrylic Semi-gloss Black. Tail pipe was Gunze H76 Burnt Iron on the inside and Tamiya X-11 Chrome Silver on the outside. The front windscreen panel was tinted with Gunze H93 Clear Blue, with the anti-collision light on the 'hump' getting a coat of H90 Clear Red. The area around the cannon was Matt Black, with the gun barrels in semi-gloss black with chrome silver muzzles. The IFR probe was picked out in Tamiya X-10 Gun Metal and X-56 Metallic Grey.

After painting, the model was given a coat of



Italeri, Fujimi, Matchbox comparison

sheet for SEA schemed RNZAF A-4s was ever produced in 1/72. This is Microscale 72-437. I'm not sure when it was first produced, but it seems to be generally unavailable now. I was lucky to

the RNZAF Kiwi roundels from the sheet as they are very poor renditions. They were replaced with roundels from a 'Flying Kiwis' RNZAF roundel sheet.

As a note, when modelling RNZAF aircraft, the Kiwi always faces forward, feet towards fuselage if on a wing surface. All the other decals are fine, just one or two being slightly out of register. The serials appear to be not quite proportioned correctly; they should take up slightly less horizontal space than they do – this is only a minor gripe though. The yellow walk way guides on the wings came from a Hasegawa missile set. They are slightly overscale, but do the job. The explosive warning labels behind the cockpit are also surplus Hasegawa. This label did change in appearance and positioning over the years. The

"The Hasegawa 1/72 A-4E/F is an older Hasegawa mould dating from the 1960s..."

Micro-Gloss prior to decaling. Decals for RNZAF A-4s haven't exactly been thick on the ground historically in 1/72 scale. Aside from the recent Model Alliance 'Golden Scooter' release, depicting the 50th anniversary scheme of 1987, the New Zealand based 'Flying Kiwis' produced a set for the Euro 1 scheme in the 1990s, and for the final green scheme, but as far as I know only one

find a set on 'Trademe', (the New Zealand equivalent of Ebay), after searching for some time in model shops and on the internet.

The sheet provides insignia and decals for four A-4Ks and two TA-4Ks from No 75 Squadron, with both straight and swept fin flashes, as well as Singaporean A-4Ss and TA-4Ss. Full stencilling is also provided. I discarded



Kahu and K comparison



Microscale sheet has an early version, the ones I used are later. All the decals used went down beautifully with no silvering, and had no issues with Micro Sol or Micro Set.

The scheme in reality varied from immaculate to downright scruffy, but I like my models fairly clean, so weathering was limited to a black wash for the control surface hinge lines and the wheels. The starboard wing got some unintentional weathering when a tiny amount of black paint got into the matt coat due to the brush not being as clean as I thought it was...

to appear more scale. This didn't occur to me until after the model was finished, for some reason. The spacing on the rails is not quite correct, due to their locations being translated from a Fujimi slat which is somewhat smaller, and I found out long after finishing the model that the runners themselves should be chrome rather than red...

"Before I assembled the fuselage, I had to modify the fin with a square tip rather than the curved style..."

Final detailing

After decaling was concluded, the model was coated in Gunze Sangyo H20 Flat Clear for a matt finish, and all the fiddly bits added. The underwing load was based on an RNZAF publicity photo from the 1970s, with three tanks, a Zuni pod from a Fujimi kit on station one, (port outer), and an AIM-9 Sidewinder rail courtesy of Ron's Resins on station 5. In the original photo, the centreline station was occupied by a Mk 82 loaded Multiple Ejector Rack. I have Fujimi MERs in my spares box, which are nice, but no worthwhile bombs, so I added the centreline tank instead. I also don't have any AIM-9Gs as per the photo so the missile rail stayed empty. The IFR probe was reattached for the final time – only to be broken off again when transporting the model to a local model show!

The undercarriage was attached, minus the nose gear steering arm (part C45), which is moulded so badly, (no shape, three sprue attachment points along its length...), I didn't use it. The mainwheel doors have some nice moulded interior detail, although the prominent landing light on the starboard door is missing, (as it is in every other 1/72 A-4 kit I have seen, including the otherwise excellent Fujimi series).

Not being in a fully accurising mood, I didn't scrounge one, although on my later A-4 builds I have found surplus 1/48 F-4 landing lights to be nicely sized substitutes. The VHF aerial on the 'hump' was cut from plastic sheet, using shape and dimensions scaled down from the equivalent 1/48 scale Hasegawa A-4K part, then painted white and added to the model in place of the existing aerial.

The slats were reattached using .015 x .030 Evergreen strip to simulate the runners – somewhat crudely. If I ever do this again slots for the runners will be cut in the leading edge to do it properly, as well as thinning the slats themselves

scale issues. Placed next to an Italeri

or Fujimi A-4F it looks like it has been taking some sort of growth supplement – mind you the Italeri A-4 looks slightly undernourished compared to the Fujimi offering. My intention with this build was to keep it 'out-of-the-box' as much as possible, and mainly use it as a 'clothes horse' for the colour scheme.

As I have examples of Italeri, Matchbox and Fujimi A-4s, some direct comparisons could be made. Hasegawa is noticeably longer than Italeri or Fujimi, (Matchbox should be shorter anyway, being an A-4M). Hasegawa is also taller than Italeri, and has a visibly broader fin than the others. Tailplane span, shape and sweep also varies between the kits. Wingspan is fairly consistent. I have never been a measurer or rivet counter, so will produce no definitive judgement as to which is the most accurate, apart from saying it is not likely to be this Hasegawa offering! If you want a more accurate 1/72 A-4, try Fujimi, Italeri or ESCI.

Still, I am pretty happy with the final result, which was originally intended to be a quick, out-of-the-box build, but then became a sort of half accurised monster. To be fully accurate it would require a bit more work, mainly on the wing

undersurface as the K was configured slightly differently around the undercarriage fairings to other models. Also the rearward facing aerals on the 'sugar scoop' above the tailpipe would need to be added.

Now if only Hasegawa can scale their 1/48 kit to 1/72... HAM

Conclusion

It looks like an A-4. If you want a quick and relatively easy/painless Skyhawk, and aren't too concerned about accuracy, give this one a go. If you want an accurate 1/72 Skyhawk however there are better options. The detail just isn't there, and the kit has definite shape and accuracy issues, particularly around the nose, as well as



Beside a piece of the real NZ6203

References used

- 'Topped Gun: Requiem for the Skyhawk' by Ross Ewing, ISBN 0-473-08560-7
- 'Douglas A-4 Skyhawk' by Jim Winchester, ISBN 1-84415-085-2
- Personal photos and resources
- And a couple of excellent reference sites for Kiwi Skyhawks
http://www.gibstuff.net/a4_alley/index.html
<http://www.motty.hobbyvista.com/A-4s-01/Kiwi-Skyhawks-01.html>
- Microscale 72-437 and Flying Kiwis RNZAF roundel decals used.

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Two-tone grey Dark Sea Grey upper surfaces over Dark Camouflage Grey coloured Harrier GR.7, ZD466/56 from 3 Sqn at RAF Leuchars on 17.11.05 during a CQWI Course with AAR probe extended and crew access ladder in place, aircraft is loaded with a pair of drop tanks

21st Century Harrier

BAe Harrier GR.7 to 9A in current UK service. Des Brennan looks at the Harrier in current RAF service

The Hawker Siddeley, (later BAe), Harrier GR.1 entered service with the Royal Air Force in 1969 and during 20 years of service was developed to meet changing needs, roles, weapons and technology. In 1988 the second generation of Harrier, the GR.5, was rapidly followed in 1990 by the definitive GR.7 version with its distinctive nose contours containing LRMTS, (Laser Ranger and Marked Target Seeker), and FLIR, (Forward Looking Infra-Red), and remains a crucial component of UK air operations.

It goes without saying that the British path to the second generation Harrier was less than smooth, having first dropped out of a joint US/UK development programme then later to come back as a customer with British Aerospace (BAe) merely serving as a contractor. Then, as is depressingly familiar with the UK procurement system, 'anglicising' the programme to incorporate British systems created the traditional timing and costing overruns leading to eventual compromises in equipment and capability.

Initially, the RAF was to operate the Harrier GR.5, (roughly equivalent to the USAF's AV-8B), alongside the Harrier GR.7 (based on the Night Attack AV-8B), but subsequently standardised on the GR.7 with earlier aircraft being upgraded. Although designated GR, for Ground Attack and Reconnaissance, the latter role was limited by budgetary cuts to a single, side-mounted camera or centreline mounted pods as with first generation aircraft.

Unlike the first generation Harriers, the GR.5/7 series was not gun equipped, the existing cannon being unsuitable, with the US version considered to lack 'punch' and a new British designed gun failing to work properly despite great effort and cost. However, all second generation Harriers in UK service routinely carry either the cannon fairings or alternative aerodynamic fuselage strakes which, together with the retractable cross-dam behind the



Port side view of an unmarked Harrier GR.9, ZG859/91A, in the overall Medium Sea Grey colour scheme, sitting on the runway waiting for clearance to take off at RAF Lossiemouth on 26 September 2007 during Exercise 'Neptune Warrior'

nose undercarriage, trap air to improve Vertical and Short Take Off and Landing (V/STOL) performance.

Serving originally with the RAF in the UK and Germany, the operational units of the fleet, Nos 1 and 4 Squadrons, are now based at RAF Cottesmore with the Operational Conversion Unit (OCU), No. 20 (Reserve) Squadron, nearby at RAF Wittering. In addition, the former Fast Jet Operational Evaluation Unit, (FJOEU), of the Air Warfare Centre, (AWC), which adopted the identity of No 41 Squadron in 2006, operates a few aircraft from RAF Coningsby.

No 3 Sqn had been the other long serving Harrier unit until it stood down in 2006 to re-equip with the Eurofighter Typhoon. Since the withdrawal of the Sea Harrier FA.2 from Royal Navy service the Fleet Air Arm has also operated the Harrier GR.7, from Cottesmore when ashore, with Nos 800 and 801 Naval Air Squadrons (NAS) from which a deployable component, the Naval Strike Wing (NSW), is drawn.

From GR.7 to GR.9

Since entering service, the Harrier GR.7 has undergone the minor equipment upgrades associated

with any combat aircraft, leading to minor aerial changes etc. Additionally, there have been two major projects which have brought changes in designation through the introduction of an Integrated Weapons Programme, (IWP), allowing the use of more advanced weaponry such as Brim-



Tail area of unmarked Harrier GR.9, ZG859/91A, in the Medium Sea Grey colour scheme at RAF Lossiemouth on 26.09.07 during Exercise 'Neptune Warrior' shows the many vents and aerials fitted in this area of the aircraft as well as the GR.9 logo carried by some of the upgraded airframes



Starboard view of unmarked Harrier GR.9, ZG859/91A, in the Medium Sea Grey colour scheme taking to the runway at RAF Lossiemouth on 26.09.07 during Exercise 'Neptune Warrior'. The RAIDS pod carried on a BOL launch rail/countermeasures dispenser can be seen under the starboard wing along with a drop tank, as can the aerodynamic strakes fitted under the fuselage

"...two major projects have brought changes in the type's designation to Harrier GR.9..."



Rear view of unmarked Harrier GR.9, ZD435/47, in the Medium Sea Grey colour scheme beginning its take-off at RAF Lossiemouth on 26.09.07 during Exercise 'Neptune Warrior' shows lowered flaps and airbrake



An otherwise unmarked Harrier GR.9, ZD435/47 in the overall Medium Sea Grey scheme approaches to land at RAF Lossiemouth during Exercise 'Neptune Warrior' on 26.09.07 shows the underfuselage aerodynamic strakes and lowered fuselage cross-dam to good effect. The white missile-shaped pod under the starboard wing is a RAIDS Pod



Head-on view of Harrier GR.9, ZD375/23 from 4 Sqn in the two-tone grey Dark Sea Grey upper surfaces over Dark Camouflage Grey colour scheme, at RAF Kinloss on 20.11.07 for a CQWI Course shows the distinctive LRTMS nose optic as well as the stores load of (left-to-right) CBLS, RAIDS Pod on a BOL launch rail/countermeasures dispenser, drop tank (both sides), inert AIM-9 Sidewinder on a BOL and an inert AGM-65 Maverick ASM



Close-up of the AGM-65 Maverick, Inert AIM-9 Sidewinder AAM on a BOL launch rail/countermeasures dispenser and drop tank carried under the port wing of Harrier GR.9, ZD375/23 from 4 Sqn in the two-tone grey Dark Sea Grey upper surfaces over Dark Camouflage Grey colour scheme, which was at RAF Kinloss on 20.11.07 for a CQWI Course. The Maverick has a red plastic cap over the nose optics to protect it on the ground and blue stripes to signify that it is an inert training round



Starboard sideview of Harrier GR.9, ZD375/23 from 4 Sqn in the two-tone grey colour scheme at RAF Kinloss on 20.11.07 for a CQWI Course. The aircraft is loaded with a RAIDS pod on a BOL launch rail/countermeasures dispenser, CBLS and a drop tank



Port sideview of a Medium Sea Grey painted Harrier GR.9, ZG506/77 of 20(R) Sqn at Kinloss on 20.11.07 during a CQWI Course. Aircraft carries an inert AGM-65 Maverick, Inert AIM-9 Sidewinder AAM on a BOL launch rail/countermeasures dispenser and a drop tank under the port wing. Crew access ladder is in place and AAR probe is extended



Front starboard view of a Medium Sea Grey painted Harrier GR.9, ZG506/77 of 20(R) Sqn at Kinloss on 20.11.07 during a CQWI Course, aircraft is loaded with a RAIDS Pod on a BOL launch rail/countermeasures dispenser, CBLS and a drop tank



Line-up of Harrier GR.9 and T.10 aircraft at Kinloss on 20.11.07 with Medium Sea Grey painted ZG506/77 from 20(R) Sqn in the foreground clearly shows the difference between this colour scheme and the older Camouflage Grey/Dark Sea Grey aircraft beyond



Port side view of a two-tone grey Dark Sea Grey/Dark Camouflage Grey painted Harrier GR.7A, ZD404/33A in 1 Sqn markings at Kinloss on 20.11.07 during a CQWI Course. The aircraft carries an inert AIM-9 Sidewinder AAM on a BOL launch rail/countermeasures dispenser and a droptank under the port wing and a TIALD Designator Pod in place of the port fuselage strake (RAIDS pod on a BOL rail, drop tank and fuselage strake to starboard). Crew access ladder is in place for this image partially obscuring mission markings. Although in 1 Sqn colours the engine FOD covers were marked 41 Sqn and the groundcrew were from the Royal Navy



Close-up of the mission markings on a Dark Sea Grey/Dark Camouflage Grey painted Harrier GR.7A, ZD404/33A in 1 Sqn markings at Kinloss on 20.11.07 during a CQWI Course shows a mix of both 'dumb' and LGB bomb markers as well as heavy wear around the intake lips. Was the loss of most of the 'Lucy' artwork the result of a panel replacement during normal servicing or to avoid hurting the feelings of those on the receiving end of the mission markings?



Close up from the side of the AAR probe in the open position on a Medium Sea Grey painted Harrier GR.9, ZG506/77 of 20(R) Sqn at Kinloss on 20.11.07 during a CQWI Course

stone and Storm Shadow as well as the installation of a more powerful engine, the Rolls Royce Pegasus Mk.107 and associated work to remedy fatigue in the rear fuselage.

A simple explanation is that GR.7 aircraft, with the more powerful engine, are now designated GR.7A, whilst aircraft which have also undergone the IWP are designated GR.9 and 9A respectively. Visual clues to these programmes are not too obvious although some aircraft do wear a 'GR9' logo on the tail, the website www.harrierlist.co.uk provides a simple at-a-glance reference to individual aircraft designation.

Colours

Second generation Harriers entered service in a two-tone green colour scheme of NATO IRR Satin Dark Green (BSC241) over Satin Lichen Green (BS4800.12B.25).

In common with many other RAF combat aircraft types this changed around the turn of the century to an overall grey scheme of Dark Sea Grey (BS381C 638) upper surfaces over Dark Cam-



Close-up of the AAR Probe in the closed position on a Dark Sea Grey/Dark Camouflage Grey painted Harrier GR.7A, ZD404/33A in 1 Sqn markings at Kinloss on 20.11.07 during a CQWI Course

ouflage Grey (BS381C 629) undersides which is now giving way to an overall Medium Sea Grey (BS381C 637) colour scheme, although aircraft in one colour scheme are often seen with panels from the other. A buff coloured protective strip is standard along the leading edges of the wings, tailplanes and fin.

Unit markings have been worn fairly consistently by the Harrier GR.7 and there have been several anniversary and display special schemes often centred on highly coloured tails. Following many years of squadron-coded aircraft, the Harrier adopted a permanent system of fleet numbering based on production and conversion numbers.

During operations over the Balkans and the Iraqi No Fly Zones, the Harrier was given an over-

"...the Dark Sea Grey/Dark Camouflage Grey scheme is giving way to overall Medium Sea Grey..."



Port side view of an unmarked two-tone grey Dark Sea Grey/Dark Camouflage Grey scheme, Harrier GR.9A, ZD433/45A with mission markings seen at RAF Lossiemouth on 05.09.07. The aircraft was being operated by the Royal Navy and was carrying live 1,000lb bombs as part of the continuing process of reducing Garvie Island in the Cape Wrath Weapons Range to gravel! The aircraft was also loaded with a drop tank and BOL launch rail/countermeasures dispenser under each wing with an inert AIM-9 Sidewinder fitted to that on the port side



Close-up of the rocket pod and 'dumb' bomb mission markings on the Royal Navy operated Dark Sea Grey/Dark Camouflage Grey coloured Harrier GR.9A, ZD433/45A seen at RAF Lossiemouth on 05.09.07



Two-tone grey Dark Sea Grey/Dark Camouflage Grey painted Harrier GR.7, ZD378/26A of 800 NAS with LGB mission markings seen at RAF Leuchars on 14.06.06. Aircraft is carrying a BOL launch rail/countermeasures dispenser and a drop tank under the port wing

all temporary coat of ARTF Light Grey, whilst those now operating over Afghanistan appear in their usual 'standard' camouflage colours. Whilst engaged in these missions such aircraft have tended to operate without unit markings but with mission markings and occasional nose art, although only the former tend to survive for very long beyond the combat zone.

The images

The photos accompanying this article have been taken over the past few years at all three Scottish RAF Bases of Kinloss, Leuchars and Lossiemouth, either 'over the fence' in passing, or on occasions arranged through the relevant Media and Communications Officers, to whom my thanks are given, as well as to their different Station Commanders for allowing such visits. Many were taken during exercises such as the 'Neptune Warrior' series of



Port side view of Harrier GR.7, ZD322/03 of 20(R) Squadron in two-tone grey Dark Sea Grey/Dark Camouflage Grey colour scheme, taxies in the rain at RAF Leuchars on 23.05.05 for a CQWI Course mission. Aircraft carries a TIALD Designator Pod in place of the port fuselage strake and is loaded with drop tanks under both wings and an inert AIM-9 Sidewinder to Port and RAIDS Pod to starboard both carried on BOL launch rail/countermeasures dispensers

NATO Maritime exercises or the Combined Qualified Weapons Instructor Courses, (CQWIC), both of which bring a range of RAF and other fast jet types together.

Whilst the Harrier GR.7 can carry a wide range of guided and unguided weaponry, most of my images show the aircraft loaded with typical 'everyday' loads of inert and training stores such as the CBLs, (Carrier Bomb Light Stores), for blue practice bomblets; acquisition rounds of the inert and finless AIM-9 Sidewinder air-to-air missile, (AAM), with an active seeker carried on either a standard missile launch rail, or increasingly, on BOL launch rail/countermeasures dispensers; inert AGM-65 Maverick air-to-surface missile, (ASM); RAIDS, (Rangeless Airborne Instrumented De-Briefing System), pod; TIALD, (Thermal Imaging and Laser Designator), Pod although the US built 'Sniper Pod' is now also cleared for use.

Air-to-air refuelling probes, (AAR), are carried as normal fit and it can also be seen that the fuselage-mounted strobe lights can be either clear or green tinted.

In everyday use the aircraft get quite dirty and scuffed, especially around the cockpit, undersides, and rear fuselage, and often have very definite signs of wear around the air intakes which are usually protected on the ground by Intake/Foreign Object Damage (FOD) guards.

Modelling the Harrier GR.7

The Harrier GR.7 is well served by injection moulded kits and can be found in 1/144 and 1/100 scales by Revell, (1/100 is in their 'Easy Kit' pre-painted range); 1/72 scale by Hasegawa, Italeri, (also boxed by Revell), and Airfix, (the GR.5 and GR.7 kits share the same parts with alternative noses); and 1/48 scale by Hasegawa which is also listed as a future Revell re-boxing. Although there



Starboard side view of a Dark Sea Grey/Dark Camouflage Grey painted Harrier GR.9, ZG501 (Fleet No 72) in standard 41 Sqn markings at RAF Kinloss for a CQWI Course on 16.11.06 with red protective cover over the LRMTS optic. This aircraft is fitted with fuselage mounted gun pod fairings and carries a drop tank and BOL launch rail/countermeasures dispenser under the starboard wing



Close-up of the 4 Sqn, '95th. Anniversary' markings on a Medium Sea Grey coloured Harrier GR.9, ZD410 (Fleet No 39) at RAF Lossiemouth on 26.09.07 during Exercise 'Neptune Warrior'



Starboard side view of the 2004 season, black-tailed 20(R) Sqn, 'Display Harrier' GR.7, ZD407/36 in the two-tone grey Dark Sea Grey/Dark Camouflage Grey colour scheme, departing for a CQWI Course mission at RAF Leuchars on 24.11.04. The aircraft is fitted with fuselage strakes and carries a drop tank, inert AGM-65 Mavericks and a standard Sidewinder launch rail under the starboard wing

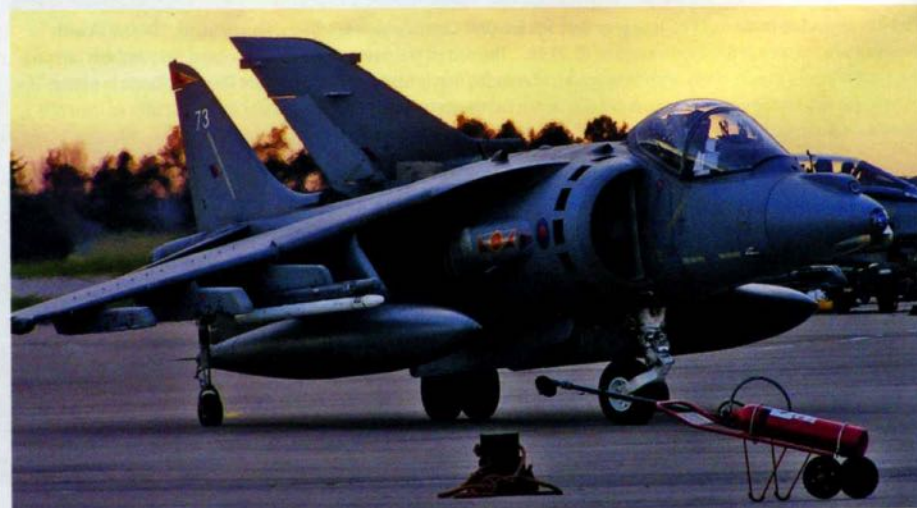
are no kits currently available in 1/32 it is always possible that a suggested future release by Trumpeter could also appear as a GR.7, or encourage an after-market conversion.

A wide range of GR.7 decals is available in 1/72 from Modeldecals, (green scheme), 1/48 scales from Sky Models and in both scales from Model Alliance and Xtradecals, (stencilling).

Over the years there have been a number of aftermarket resin and etched metal parts released for the Harrier GR.7 but due to the turnover in manufacturers and the limited production runs of some items, a definitive list is impractical. **MAM**



Starboard side view of the white-tailed 41 Sqn Harrier GR.9A, ZG478 (Fleet No 68A) in the two-tone grey Dark Sea Grey/Dark Camouflage Grey colour scheme, returning from a CQWI Course mission in the rapidly falling dusk at RAF Kinloss on 16.11.06. The aircraft carries a drop tank and an inert AIM-9 Sidewinder AAM mounted on a BOL launch rail/countermeasures dispenser under the starboard wing



Two-tone grey Dark Sea Grey/Dark Camouflage Grey coloured Harrier GR.9, ZG502/73 of 800 NAS taxies in at dusk following completion of a CQWI Course sortie at RAF Kinloss on 16.11.06. Aircraft carries a drop tank under each wing and a RAIDS pod to starboard, inert AIM-9 Sidewinder to port both of which are mounted on BOL launch rail/countermeasures dispensers

AIR WARS

PART
12

Desert Storm Part 2



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TESTORS

Desert Storm

Part 2: The United States Air Force

In this second part of the Air Wars 'Desert Storm' coverage, 'MAM's Assistant Editor Andy Evans takes a look at the USAF's major aircraft, their war role and operations

At precisely 2.38am on 17th January 1991, laser guided Hellfire missiles launched from eight US Army AH-64 Apache helicopters began ripping apart two early warning/intercept sites in far western Iraq. Buildings crumbled from the pounding and within 30 minutes the area was disabled. Moments later came the eerie sound of hundreds of fighters, bombers and cruise missiles funnelling down the newly created 'radar black' corridor heading for their targets inside Iraq. Operation Desert Storm had begun.

For the US Air Force this was a defining moment, as they brought to bear some of the most devastating weapons and weapons platforms in their arsenal. Some aircraft were old and trusted, like the B-52, the F-111 and F-4 Phantom, whilst others were brand new and cutting edge, like the F-117 Stealth Fighter and the F-15E Strike Eagle; many were versatile and numerous like the F-16 Viper and the slated-for-retirement A-10 Warthog, whereas the sleek shape of the F-15C Eagle became the air defender supreme.

The world had not witnessed such concentrated firepower for nearly fifty years, as out of the darkness the Iraqi military were hit by a force they could not see and did not fully understand. What was clear from the outset was this would be the first 'technology' war, where precision guided bombs and missiles would be used, satellites would be employed for intelligence and targeting information and orbiting AWACS and the latest J-STARS airborne surveillance aircraft would direct and shape the air campaign.

That is not to say that traditional methods were ignored, indeed the mere presence of the B-52 with its massive capacity for destruction heralded wave after wave of 'Vietnam style carpet bombing'. The USAF's Special Operations Command also played a major



Post-war, a gathering of fast movers in the shape of F-16s and F-15s

role with their unique versions of the ubiquitous C-130 Hercules, and the indomitable Pave Low helicopter.

The air campaign over Iraq was set to prove the effectiveness that airborne weaponry could bring to a conflict, and would have ramifications for the future shape of the Air Force, and indeed the forces of the participating Coalition.

The Fighters

'Eagles Wings' – The F-15C

Following the Iraqi invasion of Kuwait on 6 August 1990, the US launched Operation 'Desert Shield' to defend against any Iraqi moves southward against Saudi Arabia and the 1st Tactical Fighter Wing based at Langley AFB began deployment of its F-15C Eagle fighters to Dhahran. The F-15Cs quickly began flying combat air patrols in co-operation with Saudi F-15s and British and Saudi Tornado F3s. A second round of Desert Shield build-ups began in November of 1990 when the 33rd TFW deployed its 58th TFS's F-15C Eagles to Tabuk in western Saudi Arabia, whilst the 53rd TFS based at Bitburg in Germany was also deployed to Tabuk, and aircraft of the 525th TFS joined the 7440th Composite Wing

based at Incirlik in Turkey and were joined by the Soesterberg based 32nd TFS.

When operation Desert Storm began the majority of the air-to-air engagements were undertaken by the F-15C, and most of these by pilots of the 58th TFS. 41 enemy aircraft were destroyed by USAF F-15Cs during the Gulf War, against zero losses, however the bulk of the 'kills' were against Iraqi aircraft caught by chance or attempting to flee to Iran, as it seemed they had no real appetite to engage the coalition aircraft. There was relatively little dog fighting for which the F-15 had been built to excel – and most of the 'kills' were made BVR, (Beyond Visual Range), by the AIM-7 Sparrow missile, which had performed so poorly in Vietnam but which turned in an outstanding performance in the Gulf War.

Nine 'kills' were made by the F-15C using the short range AIM-9 Sidewinder missile, although one 'kill' was credited to an F-15C pilot who caused a MiG-29 opponent to fly his aircraft into the ground. The AIM-120 AMRAAM missile was not fired in anger during the war, although it was carried offensively more than 1,000 times during combat missions during the war. One F-15C, 85-0102, scored three aerial victories, although not all were scored by the same pilot on all

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Media House, 21 Kingsway, Bedford MK42 9BJ

Tel: +44 (0) 8707 333373

Fax: +44 (0) 8707 333744

E: mail@sampublications.com

W: sampublications.com

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Desert Eagle – and F-15C waits its CAP time



Fully loaded with Sparrow and Sidewinders and Eagle on patrol

three occasions. The first 'kill' of the war took place on January 17th and was credited to Captain John K Kelk of the 58th TFS/33rd TFW flying 85-0125 out of Tabuk. He downed a MiG-29 using an AIM-7 Sparrow.

Other first day victories fell to Captain Robert Graeter with two Mirage F-1EQs, Captain Steve Tate, (also quoted in some sources as being the pilot credited with the first 'kill'), also bagging a Mirage F1EQ, "the fireball from the kill was incredible, it completely lit up the sky and I saw the aircraft break into millions of pieces" he said. Captain Charles Magill despatched another MiG-29, whilst Captain Rory Draeger 'splashed' another. The final F-15C victory of the campaign fell to Captain Mark McKenzie who possibly brought down a Mi-8 helicopter with a Sparrow on 14 February. Two F-15C pilots are also credited with three aerial victories apiece, although one of each of these victories occurred on 22 March 1991, after the war was officially over.

The Bombers

'The Wobblin Goblin' – F-117A Nighthawk

The secretive and much vaunted F-117 was used to attack the most heavily fortified targets during Desert Storm, and was the only coalition jet allowed to strike targets inside Baghdad's City limits. Although only thirty-six of the aircraft were deployed in Desert Storm and accounted for 2.5 percent of the total force of 1,900 fighters and bombers, they flew more than a third of the bombing sorties on the first day of the war. In all during Desert Storm, the F-117s conducted more than 1,250 sorties, dropped more than 2,000 tons of bombs, and flew more than 6,900 hours. Over Baghdad more than 3,000 antiaircraft guns and sixty surface-to-air missile batteries protected the city, but despite this seemingly impenetrable shield, the Nighthawks owned the skies over the city.

On 20 August 1990, F-117s left Tonopah in the US to fly across the Atlantic to King Khaled Air Base in Saudi Arabia, well out of range of Iraqi Scud missiles and equipped with hardened shelters and which soon became known as Tonopah East. On 15 January 1991, the deadline specified by the UN resolution expired and the F-117 pilots were briefed for their strikes. They would be among the leading elements in the air war, knocking out air-defence centres and

other vital elements in the Iraqi war machine to allow conventional strike aircraft to make further raids unharmed.

The targets were at long range for the F-117, and the pilots would have to perform several in-flight refuelling hook ups for each mission. At 2:38am, US Army Apache helicopter gunships fired the first shots in the air war by knocking out early warning radars near the Iraqi border. By this time, eight F-117s were moving into Iraqi airspace and at 2:51am, one of the F-117s dropped a laser-guided bomb on a bunker that contained an air-defence control centre, blowing off the bunker's doors. At 2:56 am they hit communications centres; Iraqi Air Force Headquarters; an air-defence centre; and one of Saddam Hussein's palaces. The first two waves dropped thirty-three LGBs and scored twenty-three hits.

A third and final wave came in just before dawn to hit chemical and biological weapons bunkers. Over the next few days the F-117s returned as the Iraqis poured anti-aircraft fire into the night sky over Baghdad, almost at random and without effect. One pilot claimed he simply lowered his seat so he couldn't be distracted by the fireworks, allowing him to concen-



An F-15C takes on gas

trate on his target run.

From then on the F-117s continued the assaults on command-and-control centres, hardened aircraft shelters, chemical-biological weapons dumps, and other targets. On 21 January, the Nighthawks hit and crippled a nuclear research facility in Baghdad, putting it out of operation. The Saudis gave the F-117 a nickname: 'shaba', Arabic for 'ghost'. On the night of 27 February 1991 the F-117s returned to Baghdad, going downtown with two waves of strikes that did particular damage to the Baa'th Party Headquarters. A third wave was called off, and a short time later a cease-fire was announced. The Gulf War was over.

For a typical strike the pilot operates a Honeywell ring-laser gyro inertial navigation system and an exceptionally accurate weapons computer. He also uses a FLIR (forward looking IR) sensor that produces near TV-quality images of distant objects, even on hazy nights. A second DLIR (downward-looking IR) system under the aircraft is used for weapons delivery. The downward looking IR sensor is bore sighted to a laser designator to guide the LGBs. After acquiring the target, the pilot positions a cross hair on the aim point and activates the laser designator. The computer then takes over, and when the pilot depresses the 'pickle' button, it releases the weapon.

The principal munition for the F-117 was the GBU-27, an improved 2,000lb bomb, modified with a Paveway III laser guidance kit. The casing is forged from high-strength steel and its slim bullet shape enabled it to penetrate reinforced concrete more than six feet thick, remain intact, and then detonate. Other weapons employed by the F-117A were the standard 2,000lb bomb and the 500lb Mk 82, both with Paveway II laser guidance kits.

'Buff Bombers' – B-52G

Despite its age the Boeing B-52 Stratofortress performed, (and indeed still performs), superbly in the conflict. Even though the B-52G was in the process of being phased out, the aircraft were still operated against Iraq from US bases as well as those in Jed-



The targets were at long range for the F-117, and the pilots would have to perform several in-flight refuelling hook ups for each mission



Plumes of smoke as this heavy laden Buff heads out



Taking on gas before pressing the mission

dah, Saudi Arabia; Moron, Spain; Fairford in the UK and Diego Garcia in the Indian Ocean. Assigned with conventional bombing, initially the aircraft were tasked with hitting strategic targets such as power stations in northern Iraq, however most of their operations were carried out against dug-in Republican Guard units in Kuwait.



Arming the Buff with weapons on the wing pylons

Testors® Paints — USAF Gulf War Colours

Aircraft Usage & Notes	FS 595a/b	ModelMaster Enamels	ModelMaster Acryl	POLLY Scale Acrylics
A-10 Euro I	FS34092	1764 Euro I Dark Green	4729 Euro I Dark Green	F505246 K3/178 Foliage Green
A-10 Euro I	FS36081	1788 Euro I Gray	4750 Euro I Gray	F505204 Grimy Black
A-10 Euro I	FS36118	1723 Gunship Gray	4752 Gunship Gray	F505382 US Gunship Gray
A-7 (Air National Guard)	FS34079	1710 Dark Green	4726 Dark Green	F505388 US TAC Dk Green
A-7 (Air National Guard)	FS36081	1788 Euro I Gray	4750 Euro I Gray	F505204 Grimy Black
B-52 Monochromatic Scheme	FS36081	1788 Euro I Gray	4750 Euro I Gray	F505204 Grimy Black
B-52 Monochromatic Scheme (Late)	FS36118	1723 Gunship Gray	4752 Gunship Gray	F505382 US Gunship Gray
B-52 Tactical Camouflage (Early)	FS34079	1710 Dark Green	4726 Dark Green	F505388 US TAC Dk Green
B-52 Tactical Camouflage (Early)	FS34159	1713 Medium Green	4734 Medium Green	F505390 US TAC Mid Green
B-52 Tactical Camouflage (Early)	FS34201	1792 SAC Bomber Tan	4247 #2 Green (~)	F505230 Topside Green
B-52 Tactical Camouflage (Early)	FS36081	1788 Euro I Gray	4750 Euro I Gray	F505204 Grimy Black
B-52 Tactical Camouflage (Late)	FS34086	1787 Green Drab	4727 Green Drab	F505322 Olive Green
B-52 Tactical Camouflage (Late)	FS34086	1787 Green Drab	4727 Green Drab	F505322 Olive Green
B-52 Tactical Camouflage (Late)	FS36081	1788 Euro I Gray	4750 Euro I Gray	F505204 Grimy Black
B-52 Tactical Camouflage (Late)	FS36118	1723 Gunship Gray	4752 Gunship Gray	F505382 US Gunship Gray
C-130, C-141, C-5 Euro I	FS34092	1764 Euro I Dark Green	4729 Euro I Dark Green	F505246 K3/178 Foliage Green
C-130, C-141, C-5 Euro I	FS34102	1713 Medium Green	4734 Medium Green	F505390 US TAC Mid Green
C-130, C-141, C-5 Euro I	FS36118	1723 Gunship Gray	4752 Gunship Gray	F505382 US Gunship Gray
E-3 AWACS	FS16515	2039 Canadian Voodoo Grey	4244 5-P Pale Grey (gloss)	F505326 Pale Blue-Gray 5-P (gloss)
E-3 AWACS	FS17875	1745 Insignia White	4696 Gloss White	F505011 White
EC-130	FS36320	1741 Dark Ghost Gray	4761 Dark Ghost Gray	F505374 US Ghost Gray Dark
EC-130	FS36492	2038 Light Gray	4257 Hellgrau 50 (~)	F414179 SP Lettering Gray (~)
EF-111A	FS34092	1764 Euro I Dark Green	4729 Euro I Dark Green	F505246 K3/178 Foliage Green
EF-111A	FS36320	1741 Dark Ghost Gray	4761 Dark Ghost Gray	F505374 US Ghost Gray Dark
F-111A/D/E/F	FS30219	1742 Dark Tan	4709 Dark Tan	F505392 US TAC Tan
F-111A/D/E/F	FS34079	1710 Dark Green	4726 Dark Green	F505388 US TAC Dk Green
F-111A/D/E/F	FS34102	1713 Medium Green	4734 Medium Green	F505390 US TAC Mid Green
F-111A/D/E/F	FS37038	1749 Flat Black	4768 Flat Black	F505214 Night Black
F-117, U-2	FS37038	1749 Flat Black	4768 Flat Black	F505214 Night Black
F-15 Mod Eagle	FS36176	2036 Dark Gray	4754 Dark Gray	F505232 Dark Topside Gray
F-15 Mod Eagle	FS36251	1794 Navy Aggressor Gray	4251 Kure Naval Arsenal Gray	F505330 Haze Gray 5-H
F-15C	FS36320	1741 Dark Ghost Gray	4761 Dark Ghost Gray	F505374 US Ghost Gray Dark
F-15C	FS36375	1728 Light Ghost Gray	4762 Light Ghost Gray	F505376 US Ghost Gray Light
F-15E	FS36118	1723 Gunship Gray	4752 Gunship Gray	F505382 US Gunship Gray
F-16 "Hill Gray II" Scheme	FS36118	1723 Gunship Gray	4752 Gunship Gray	F505382 US Gunship Gray
F-16 "Hill Gray II" Scheme	FS36270	1725 Neutral Gray	4757 Neutral Gray	F505384 US Neutral Gray
F-16C	FS36118	1723 Gunship Gray	4752 Gunship Gray	F505382 US Gunship Gray
F-16C	FS36270	1725 Neutral Gray	4757 Neutral Gray	F505384 US Neutral Gray
F-16C	FS36375	1728 Light Ghost Gray	4762 Light Ghost Gray	F505376 US Ghost Gray Light
KC-135 Overall Scheme (mid-1991)	FS36320	1741 Dark Ghost Gray	4761 Dark Ghost Gray	F505374 US Ghost Gray Dark
KC-135 Overall Scheme (post-1991)	FS36173	2035 Air Mobility Command Gray	4614 German Uniform Feldgrau (~)	F505332 Ocean Gray 5-0
KC-135, KC-10 Two-Color Scheme	FS16473	1731 Aircraft Gray	4693 Aircraft Gray	F505061 RLM 76 Light Gray
KC-135, KC-10 Two-Color Scheme	FS36081	1788 Euro I Gray	4750 Euro I Gray	F505204 Grimy Black
MC-130 Euro I	FS34092	1764 Euro I Dark Green	4729 Euro I Dark Green	F505246 K3/178 Foliage Green
MC-130 Euro I	FS34102	1713 Medium Green	4734 Medium Green	F505390 US TAC Mid Green
MC-130 Euro I	FS36118	1723 Gunship Gray	4752 Gunship Gray	F505382 US Gunship Gray
MC-130 Gray Scheme	FS36320	1741 Dark Ghost Gray	4761 Dark Ghost Gray	F505374 US Ghost Gray Dark
MC-130 Gray Scheme	FS36492	2038 Light Gray	4257 Hellgrau 50 (~)	F414179 SP Lettering Gray (~)
RF-4 (wrap-around)	FS34092	1764 Euro I Dark Green	4729 Euro I Dark Green	F505246 K3/178 Foliage Green
RF-4 (wrap-around)	FS34102	1713 Medium Green	4734 Medium Green	F505390 US TAC Mid Green
RF-4 (wrap-around)	FS36081	1788 Euro I Gray	4750 Euro I Gray	F505204 Grimy Black
RF-4, F-4G	FS36118	1723 Gunship Gray	4752 Gunship Gray	F505382 US Gunship Gray
RF-4, F-4G	FS36270	1725 Neutral Gray	4757 Neutral Gray	F505384 US Neutral Gray

Note: (~) = approximate

Additionally on 17 January 1991, seven B-52Gs, known as the 'Doom Flight', took off from Barksdale AFB in Louisiana to help kick off the air campaign. They flew non-stop for thirty-five hours almost halfway around the world to launch thirty-five CAL-CMs (Conventional Air Launched Cruise Missiles) and then returned home. The routes of the missiles were planned so that they would impact their targets almost simultaneously, and thirty-three did just that.

That same day, the B-52G followed up this strike with the first low-level attacks conducted by the type after decades of training. Buffs swept into Iraqi airspace at an altitude of 3,000 feet to pound four airbases and a major road.

The B-52Gs then returned to high-altitude bombing, with three-ship formations pounding Iraqi troop



The aircraft's maximum payload was constantly used comprising of 51 bombs, 27 housed internally whilst the balance were carried on wing mounted beam pylons.

concentrations with full loads of 750lb M-117 bombs and cluster munitions. The aircraft's maximum payload was constantly used comprising fifty-one bombs, twenty-seven housed internally whilst the balance were carried on wing mounted beam pylons. Therefore a three-ship attack could yield 153 bombs creating a 1.5 mile by 1 mile swathe of destruction.

Aircraft involved came from the 2nd BW at Barksdale, 42nd BW from Loring, 93rd BW from Castle, 379th BW at Wurtsmith and the 416th BW at Griffiths. In all the B-52 performed over 1,600 sorties in dropping an estimated 25,000 tons of munitions.

No B-52s were lost in action, but one Buff crashed in the Indian Ocean on the way back to Diego Garcia after an electrical system failure, with the loss of three crew members. Two other B-52Gs were hit by Iraqi

silent, so the missile then locked onto the tail radar of a B-52G and obliterated a sizable chunk of the rear fuselage when it hit the bomber. All three of these aircraft made it safely back to base. It was reported that the ground crews applied different colour mission symbols depending on where the bombers flew from, hence black denoted Moron, red Fairford and white Jeddah.

F-111 Aardvark – the proverbial ‘bad girls’ – they went everywhere!

F-111E

Not as widely reported as the exploits of the F-111Fs the Es nevertheless played a vital role bombing targets in western Iraq, operating as part of the 7440th Composite Wing from Incirlik in Turkey. These aircraft came from the 55th, 77th and 79th TFS of the 20th Fighter Wing based at RAF Upper Heyford. None of the AMP aircraft were used in theatre and the aircraft primarily carried cluster weapons or Mk 82 or Mk 84 ‘iron bombs’ on their attacks into the northern half of Iraq.

F-111F

With their all-weather low-level capabilities and their devastating precision strike capabilities using the Pavé Tack system, the F-111Fs were a resounding success in the War. By virtue of its improved



A Liberty Wing F-111F low over the desert

TF30-P-100 engines, the F-111F was the only version not to be considered as underpowered, and despite their age, and imminent retirement in favour of the ‘Strike Eagle’, the F-111Fs were called upon to undertake some of the most demanding missions of the campaign. Eventually some sixty-six aircraft were based at Taif in Saudi Arabia and initially the aircraft were tasked with attacking hardened aircraft shelters, however, they also proved overwhelmingly effective at attacking Iraqi armour with GBU-12 LGBs in what was euphemistically termed ‘tank plinking’!

A pair of aircraft was also tasked with the ultra-

precision strike on an oil pumping facility in Kuwait that had been sabotaged and was spilling crude into the sea, using GBU-15s. A senior commander was said to have commented, “I want this target hit, give it to the F-111Fs”. The pair hit the pump manifolds with unerring accuracy, thus stemming the flow. The F-111Fs were drawn from the 492nd, 493rd and 494th TFS with five aircraft borrowed from the 495th TFS of the 48th Fighter Wing home-based at RAF Lakenheath, and were under the control of the inspirational Colonel Tom Lennon, who himself led 50 aircraft package strikes against some of the most heavily defended Iraqi targets.



An F-111 Wizzo poses by his machine



Post ‘Storm’ markings on a Lakenheath F-111F



The F-111F almost exclusively dropped PGM's, mostly of the Paveway II or Paveway III

The F-111F almost exclusively dropped PGMs, mostly of the Paveway II or Paveway III variety, using their underfuselage Ford AVQ-26 Pavé Tack pod, housed in the weapons bay. This sensor, containing both an infra-red sensor and a laser designator, made it possible to carry out attacks with such precision. GBU-12s were also used in attacks on bridges and ammunition stores, and one such attack created the largest man-made explosion ever recorded. The aircraft also carried the bespoke 5,000lb GBU-28B ‘Deep Throat’ bombs, two of which were hurriedly developed for a deep penetration strike against an underground bunker on the last night of the war. The unique Laser Guided bomb was basically an 8 inch gun barrel bored out, filled with explosive, fins and a seeker head! In fact the weapons were so hurriedly shipped for the US that the barrels were still hot from



Quite a gathering of Aardvarks!



Being prepared for war

seeker head! In fact the weapons were so hurriedly shipped for the US that the barrels were still hot from their explosive filling when they were loaded on the transport aircraft!

By the end of the war, the F-111s had flown some 2,500 sorties, destroyed 2,203 targets, including direct hits on 920 tanks, 252 artillery pieces, 245 hardened aircraft shelters, thirteen runways, 113 bunkers, and twelve bridges. A total of 5,500 bombs was dropped, and almost 85 percent of these were precision guided munitions. No aircraft were lost in combat, although one was lost in a training accident in October 1990 and two sustained damage from gunfire. As one F-111 pilot stated, "... we didn't encounter many Iraqi fighters, and if we did we just opened the taps and would be in a different country before they got a missile lock..."

Close Air Support

Falcons at War – F-16C

By far the most numerous US aircraft involved in the war was the F-16, and its flexibility and inherent capabilities made it an ideal platform to perform the mainstay of the air-to-ground missions undertaking Battlefield Air Interdiction sorties against troops, vehicles and installations. Both Air National Guard and regular USAF units were involved dropping a spectrum of munitions from iron to cluster bombs and everything in-between. The other advantage of the F-16 was its ability to carry self defence missiles, as well as offensive armament such as HARM for working with the F-4G 'Wild Weasels'. Some 249 F-16s flew over 13,340 sorties against Iraq, the most of any coalition aircraft, with five Falcons being lost in combat. Some aircraft also carried some very impressive artwork, however, unlike the RAF most of these were applied with either chalks or removable pen and few survived the return to the US.

'The Boys from Syracuse' – F/A-16A

One of the specialist Fighting Falcon units used in the Gulf War was the AHS equipped with the so-called F/A-16As of the 174th Fighter Wing, New



The Wizzo checks out the underside of the tanker whilst the pilot gets gas



Seymour Johnson based Strike Eagles gather!

York Air National Guard based at Al Kharj. The AHS – Automatic Target Handoff System was one of a number of avionics changes made to the aircraft and provided an electronic link to a Forward Air Controller on the ground, thus enabling, at the touch of a button, all the target information the pilot needed uploaded onto his HUD. The F/A-16s were not the only ground attack 'Vipers' in the war, but they felt their systems gave them an edge.

Allied to this was their pod-mounted 'Pave Claw' version of the A-10's GE GPU/5A gun, allowing attack options similar to that of the 'Hog'. However, due to software problems they went into battle without their AHS, and they soon discovered that using the 'gun' took them into the shoulder-mounted SAM arena, so both were dropped and the aircraft reconfigured for attacks with Maverick, CBU and Mk 84 bombs. Their main role in 'Desert Storm' was to undertake second echelon strikes against Republican Guard sites in Kuwait.

'High Tech Attack' – F-15E Strike Eagle

Although at the start of the war the dual role F-15E Strike Eagles were relatively new and untried, they were a great success and a pointer to how the USAF would develop its high tech attack strategies in the years following the conflict. The F-15E was based on the two-seat F-15B, however it was vastly superior in its avionics fit, and could carry an unprecedented amount of weaponry, as well as additional fuel in conformal tanks along the engine



Mission markings on the nosewheel door of an F-16C

intake sides.

Key to the aircraft's capabilities was the LANTIRN (Low Altitude Navigation Targeting Infra Red) system contained in two pods and mounted under the engine intakes. Although only some of the F-15Es were equipped with their LANTIRN targeting pods by the

end of the Gulf War, pilots claimed that 80 percent of the laser-guided bombs dropped by F-15Es hit their targets. However, difficulties were still being encountered in fully integrating the LANTIRN system with the F-15E and the commitment of the targeting pod to battle seems to have been premature, as the system was not employed in combat to its full capacity.

The aircraft was also used in the vital search for the elusive mobile Scud missile launchers, although these Scud hunts were largely unsuccessful, and the F-15Es also attacked many other Iraqi targets of opportunity. Most of these sorties were flown at medium altitude, as the F-15E did not get much of a chance to demonstrate its low-level capabilities. Strike Eagles from the recently formed units within 335th TFS/4th TFW from Seymour Johnson AFB flew hundreds of combat missions throughout the war; however, two aircraft were lost in combat, on 18 and 20 January 1991. One of the more bizarre kills was an Iraqi helicopter onto which a high flying F-15E dropped a laser guided bomb, "... it just vaporised..." claimed the crew



Armed and ready to roll, a Torrejon based F-16

'War Hogs' – A-10 Thunderbolt

Designed to undertake close air support missions and 'tank busting' sorties in a battle with Soviet forces in Europe, the A-10 was already being considered as a casualty of the peace dividend, and a now unnecessary platform. However the Gulf War was to throw a lifeline to the 'Warthog' and the aircraft and pilots responded superbly, giving the military planners an unprecedented ground attack



The F-15E represented the new technology deployed to the Gulf



A Strike Eagle blasts into the night sky for an interdiction mission

capability that hit the Iraqi Army hard. During the war the A-10s generated a mission capable rate of 95.7 percent, flew 8,100 sorties and launched 90 percent of the AGM-65 Maverick missiles, and the aircraft were seldom grounded due to maintenance problems or conditions unsuitable for flying.

No other aircraft could carry as much ordnance over a target for so long, and the aircraft proved it was capable of taking punishment as well as giving it out, and return to a rough dispersal area to be quickly rearmed and refuelled and strike at an enemy again. Primarily used against Iraqi armour in Kuwait and eastern Iraq, the A-10s also attacked other targets such as Scud missile sites and radar installations. A pair of A-10s also performed a RESCAP (Rescue Combat Air Patrol) for a downed Navy F-14 crew on 21 January 1991.

According to the Iraqi PoWs, the single most recognizable and feared aircraft at low altitude was the 'Warthog'. With its European camouflage unchanged it gave a fearsome black silhouette and was seen as deadly accurate and rarely missing its target.



A-10 pilots had a trained eye, longer gun range and a veritable cornucopia of destruction under its wings

Although the actual bomb run was terrifying, the aircraft loitering around the target prior to target acquisition caused as much, if not more, panic since the Iraqi soldiers were unsure of the chosen target.

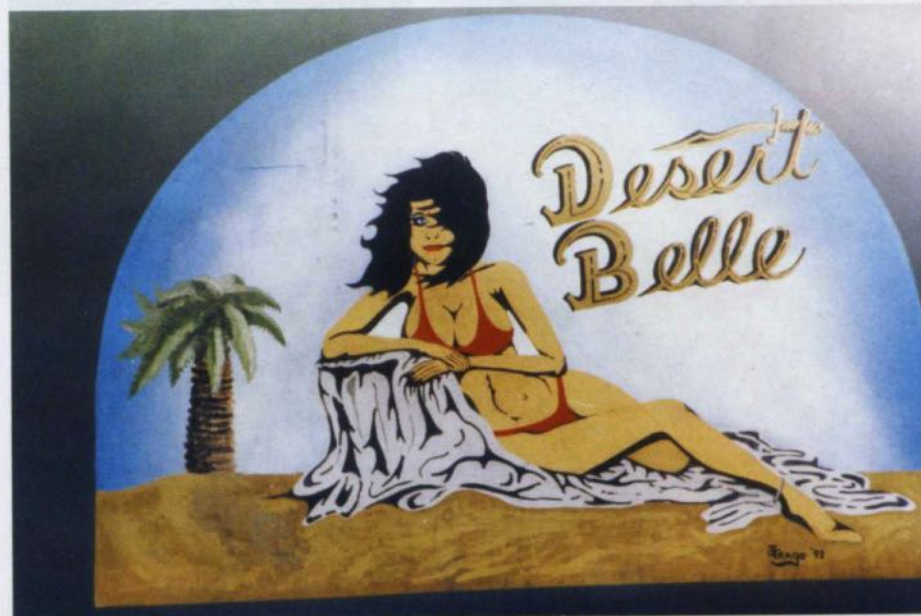
Part of the reason for this success may have been that the burning oil wells provided the Iraqi tanks with some cover from the advanced electronics of the F-15E and F-16, whereas the A-10's pilots had a trained eye, longer gun range and a veritable cornucopia of destruction under its wings. The 23rd Tactical Air Support Wing also deployed some of its Forward Air Controller OA-10s and these were used for Fast FAC missions.



During the course of the war the A-10s accounted for more than 1,000 Iraqi tanks, 2,000 military vehicles, and 1,200 artillery pieces



On patrol and waiting for a call to action



Artwork applied to 81-0947

During the course of the war the A-10s accounted for more than 1,000 Iraqi tanks, 2,000 military vehicles, and 1,200 artillery pieces and also shot down two Iraqi helicopters with their Avenger cannon, and indeed a pair of A-10s claimed no fewer than twenty-three tanks in one day on 23 February!

Seven A-10s were themselves shot down during the war, far fewer than military planners expected. Aircraft were deployed for the 10th TFW based at RAF Alconbury, the 23rd TFW at England AFB, 354th TFW from Myrtle Beach, the 706th TFS from New Orleans and the 73rd TASS at Davis Monthan. Most of the 'Warthogs' also sported individual aircraft names, and a little nose art! Such examples being: 78-0595 'Ripin Tear', 78-014 'Louisville Slugger' and 78-0677 'Kiss of Death'.

'Spectre Gunships' – AC-130

The heavily armed AC-130 was tasked with undertaking night operations against ground targets, however due to their low speed and relative short stand-off range they were restricted to lower threat areas. The 'Spectre' would orbit its target raining down shells from its side-firing pairs of 40mm cannon,



A 'Hog Driver' is guided in at the onset of Desert Shield



Spectre in flight

20mm Vulcan cannon and huge 40mm Bofors gun.

The aircraft carried infra-red and low-light TV sensors to aid its nocturnal work, with the crew wearing night vision goggles. Six AFRES AC-130As and five AFSOC AC-130Hs were deployed to the Gulf, however one 'H' was lost off the Kuwaiti coast on 21 January whilst engaging a FROG missile site. The night attack saw the aircraft staying on station until dawn when it became visible to Iraqi gunners and was brought down by a 'lucky shot' with the loss of all fourteen crew.

Reconnaissance

RF-4C Phantom

Although long in the tooth, the RF-4C was the USAF's only tactical reconnaissance asset in the Gulf War, and the conflict and its immediate aftermath were to prove the swansong for the Phantom. Before the war had started RF-4Cs of the Alabama

Air Guard were on station using their LOROP (Long Range Oblique Photography) systems to monitor Iraqi troop and armour movements.



E-3 AWACS

During 'Desert Storm' proper the aircraft were tasked with daylight tactical reconnaissance and in particular looking for mobile Scud launchers. The RF-4Cs operated from both Sheikh Isa AB with elements of the 106 TRS of the Mississippi ANG, and Incerlik in Turkey where four aircraft from the 26th TRW at Zweibrücken were based. Two aircraft were lost, 64-1044 during 'Desert Shield' and 64-1056 during 'Desert Storm'.

U-2 and TR-1A

Operating at high altitude the U-2Rs and TR-1As provided valuable stand-off reconnaissance using their synthetic aperture radars, cameras and SIGINT equipment. Real time information transfer was also enhanced by the U-2R's Senior Span system housed in an elongated dorsal dome, containing amongst other items a satellite data-link. Their many roles involved 'Scud Hunting', monitoring Iraqi armour and ship movements.

E-3 AWACS

A vital tactical cog in the war was the E-3B/C Sentry, with some twenty aircraft being used to provide airborne early warning, co-ordination and management of air assets. The aircraft were based at both Riyadh and Incerlik in Turkey.



Although long in the tooth, the RF-4C was the USAF's only tactical reconnaissance asset in the Gulf War



E-8 J-Stars

Battlefield Surveillance – E-8 J-STARS

One of the 'brand new' aircraft sent to the Gulf was the E-8 Joint STARS (Surveillance Target Attack Radar System) fitted into a specialist version of the Boeing 707, operated by Air Force crews and linked to Army battle forces. The aircraft uses specialist airborne radars to look across the battlefield and spot and plot the movement of enemy armour and troops. Although still in the development stage at the outset of the war, two prototype aircraft were despatched to the Gulf and eventually logged fifty-four missions before returning to the US in March.



An MC-130 Combat Talon



A Combat Talon takes on gas during training

Special Operations

Combat Talon – MC-130E

One of the more intriguing Hercules variants to serve was the specialised MC-130E Combat Talon. It had the distinction of dropping what were described as the 'mother of all bombs' when early in the war they 'dropped' the giant 15,000lb BLU-82/B 'Big Blue' weapons filled with fuel-air explosives designed to clear minefields. The bombs were loaded onto pallets and pushed out of the rear ramp by the crews! The aircraft, with their night capabilities, unique scissor nose retrieval system and 'duck bill' radome were also employed to insert special teams behind enemy lines and provide support for the Green Berets, Navy SEALs and the Delta Force. Six aircraft, two from the 7th SOS at Rhein Main and four from the 1st SOS at Hurlbert Field, flew a variety of covert missions during the conflict.

Combat Shadow – HC-130P/N

Originally developed to monitor re-entry of satellites and manned spacecraft, noted by its dorsal

hump containing a Cook Tracker system, the HC-130 was further developed as a Search and Rescue asset, and with the growing importance of special operations missions and combat rescue the HC-130 was outfitted as an aerial refueller for use with special operations aircraft like the MC-53 Pave Low and MH-60 Pave Hawk. The crews worked both day and night using their specialist skills tanking in darkness using radio silence and NVGs. Seven aircraft were utilised coming for the 9th and 67th SOS.

MH-53J Pave Low

Designed as a direct result of the ill-fated attempt to rescue the US hostages from Iran, the MH-53J is a specialised all-weather and nocturnal helicopter utilised by the Air Force Special Operations Command and used on a variety of covert, rescue and pathfinder missions. It was the MH-53 that led the Apache helicopters to their assigned target on the first night of the war and was instrumental in the rescue of downed



The MH-53 is a highly specialised Special Operations helicopter

US Navy Tomcat flyer Lieutenant Devon Jones. Aircraft were provided by the 20th and 21st SOS based at Hurlbert Field and RAF Woodbridge.

MH-60G Pave Hawk

Originally developed for the US Army, the USAF's Special Operations Command saw the benefits of utilising this smaller helicopter, and outfitting it with a radar and in-flight refuelling probe, together with door-mounted .50 calibre machine guns. In this guise eight MH-60Js undertook a variety of special ops missions during the war.



An RC-135

Special Operations Hercs – EC-130E/H

In all four different versions of the EC-130 were deployed to the Gulf. The 193rd SOS flew the EC-130E (CL) 'Comfy Levi', and the EC-130E (RR) 'Rivet Rider', the former being in effect an airborne TV and radio station, able to broadcast on all frequencies programmes that encouraged Iraqis to surrender and advised their situation in the war. Other EC-130Es carried two versions of the Airborne Battlefield Command Centre (ABCC and ABCCII) capsules providing intel to both the ground and airborne forces. The EC-130E (RR) 'Volant Solo' was used for ELINT (Electronic Intelligence) and COMINT operations (Communications Intelligence), whilst the EC-130H 'Compass Call' undertook communications jamming and radar interference during combat and strike missions by coalition aircraft.

Other specialist assets such as the EC-135L, the RC-135U/V/W were on hand to provide vital communications, relay and SIGINT missions



Quite a display of self preservation material!!



Pave Hawk



Some ten EF-111s were in-Theatre during the Gulf War



The EF-111 'Spark Vark' electronic jammer was based on the original F-111A and used for stand-off jamming and escort missions



Wild Weasels in their Gulf revetments

Some ten EF-111s were in theatre during the Gulf War, and these aircraft came from the 42nd ECS, 66th Electronic Combat Wing based at RAF Upper Heyford and the 390th ECS, 366th TFW based at Mountain Home. The EF-111 housed its jammers in a canoe-shaped fairing in what was the internal bomb bay, and its hostile radar receivers were housed in an enlarged tail fin pod known as the 'football'. The sensors faced forwards, sideways and backwards and were augmented by further receivers on the lower fin and the engine intake trunks. A central computer processed their data, analysed and prioritised the threats for the EWO to see, and if necessary automatically assigned the relevant jamming signal.

Despite its electronic tasking an EF-111, 66-0016 was credited with a 'kill' when it outmanoeuvred an Iraqi Mirage F.1 at low level, forcing the aircraft to collide with the ground. One EF-111 was lost in combat on 14 February 1991.

Defence Suppression

EF-111A 'Raven'

The EF-111 'Spark Vark' electronic jammer was based on the original F-111A and used for stand-off jamming and escort missions for fighter and bomber packages. The aircraft's jamming system was based on that of the already proven Navy EA-6B Prowler but with greater automation to enable just one Electronic Warfare Officer to operate it, compared to the Prowler which had three. The 'Raven's' performance enabled it to operate effectively with the 'fast movers' such as the F-111, F-16 and F-15E, creating corridors in which the bombers or fighters could operate, however it was not SEAD capable as was the EA-6, not being able to carry HARM missiles, although Sidewinders could be carried for self defence.



F-4G



The ubiquitous C-130 landing on a rough strip



A KC-135 refuels a thirsty F-15



Troops boarding a C-130 for forward deployment

'Wild Weasel Warriors' – F-4G

Another of the venerable F-4 Phantoms making its swansong was the F-4G Wild Weasel. However, akin to the A-10, the Gulf War heralded a brief post-war renaissance for the 'G', as it was the only dedicated USAF defence suppression aircraft available during and directly after the conflict. The F-4Gs also worked in concert with HARM totting F-16Cs in the 'hunter-killer' role. The aircraft came from the 52nd TFW's 23 and 81st TFSs at Spangdahlem in Germany, and the 35th TFW's 561st TFS from George AFB, and all were based at Sheikh Isa AB in Bahrain.

The 'Weasels' were amongst the busiest aircraft of the war, flying some 2,331 sorties against the Iraqi defence networks, including those located near the capital. The F-4G with its APR-47 RHWS was able to detect, analyse and prioritise threats and despatch missiles against them, keeping the skies clear for the attack packages. One F-4G was lost during the war; having been hit by enemy fire and losing fuel, the crew were forced to eject near a Saudi airstrip.

Tankers and Transports

Perhaps the unsung workhorses of any conflict are

the tanker and transport aircraft that provide a vital air bridge to the coalition countries home bases or keep the aircraft flying to their targets and home again with much needed fuel.

As ever the ubiquitous C-130 Hercules formed the backbone of the smaller transport needs flying both route and tactical missions, sometime landing on rough or unprepared airstrips on the desert to deliver troops or material to the front lines.

However, larger loads, including main battle tanks, vehicles, troops and munitions were flown aboard the giant C-5 Galaxy and the C-141 Starlifter, indeed the C-5 overtook the entire tonnage of the Berlin airlift in the first twenty-one days of the conflict! Always on station were the KC-135 and KC-10 tankers flying racetrack patterns and on hand for thirsty fighter and bombers to top off their tanks either ingressing or egressing their targets. The KC-10s had a dual tanker/transport role and conducted numerous resupply sorties to the Gulf. **MAM**

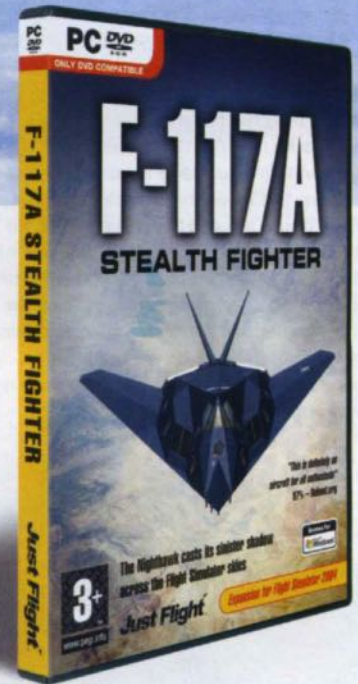
All images © Andy Evans Collection



The giant shape of the C-5 Galaxy



Fly the F-117A Stealth Fighter



Model Aircraft Monthly, in conjunction with Just Flight is offering you the opportunity to take control of one of the undoubted stars of Operation Desert Storm, the F-117A Stealth Fighter – and you don't even have to leave your armchair!

The Nighthawk casts its sinister shadow across the Flight Simulator world and the team at Just Flight has designed the F-117 so that you can now join the airborne elite and take the Nighthawk anywhere, undetected in on your computer!

You can win one of five copies of this exciting 'add-on' for Microsoft Flight Simulator X and FS 2004, and all you have to do is answer these three questions, and being 'stealthy', you can overfly some clues in this month's 'Air Wars' section that focuses on the F-117A.



Minimum System Requirements:

PC with Microsoft XP
and Flight Simulator X or 2004
512 RAM
1.7 GHz Processor
1.0 Gb Hard Drive
64 Mb Video Card
DVD-ROM Drive

5 copies be won

- Q** 1) What nickname did the Saudi's give to the F-117?
- Q** 2) From which US Air Base did the F-117s leave for Desert Storm?
- Q** 3) What are the acronyms for the two principle attack sensors fitted to the F-117?

Send your answers on a postcard to:

Stealth Fighter Competition

SAM Limited

Media House, 21 Kingsway, Bedford, MK42 9BJ, United Kingdom

Entries to arrive not later than 1 May 2008

Just Flight

www.justflight.com

Competition Rules

Employees/volunteers working for SAM Limited, Just Flight and associated companies or their families are not permitted to enter. The first 5 correct entries drawn will win. Entries are limited to one per person/household. No correspondence will be entered into. The judges' decision is final. Winners names will be published in a future edition of Model Aircraft Monthly. All entries must reach Sam Limited by 1 May 2008, when the prize draw will take place.

The Agony and the Ecstasy

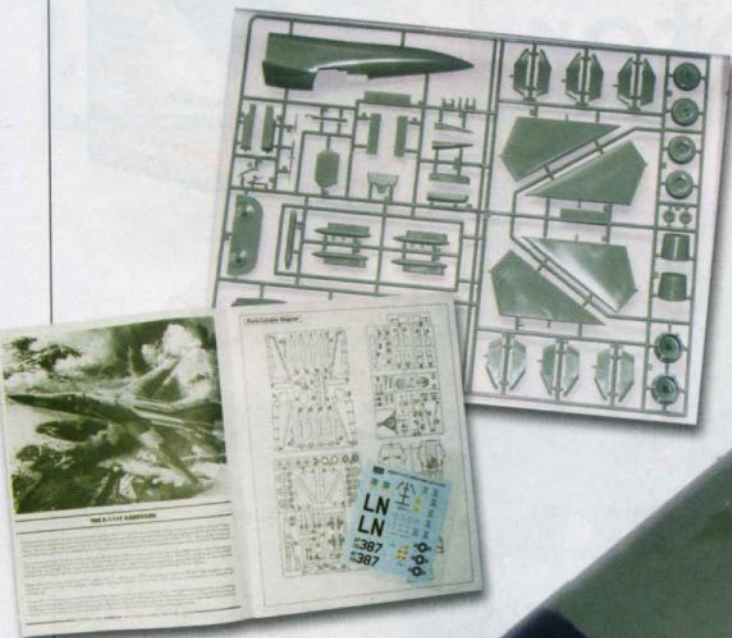
Andy Evans builds Academy's 1/48 scale F-111F 'Vark'

To build a 1/48 scale F-111F there is little choice, as only Academy manufactures anything in this scale. Sadly, the kit is a 'broad blend', designed to be able to produce a number of variants in the Academy 'Aardvark' range, and whilst looking impressive in the box, the reality is far different.

The kit is very inaccurate, the fit of the nose section to the fuselage is horrific, the triple-plove intakes, the wheel bay interior and undercarriage doors are not the correct ones for the F-111F, neither are the afterburner cans which are the wrong type, and unless you want to spend a fortune on aftermarket sets, such as the one from Scaledown, (which replaces at least fifty-percent of the Academy parts), the kit doesn't have much going for it, plus there are no weapons or Pave Tack pod included!

However, if you want to build what can only be described as a 'generic' F-111 that 'looks' like it might be an 'F' version, (from a distance), and you either cannot afford the price of an extra set to correct the inaccuracies, or you are happy to accept the basic flawed concept, (as described here),... well then, maybe the kit is ok!

The model also offers the ability to fit an internal mechanism that sweeps both the wings in concert and swivels the pylons to suit. However, being from the Midlands, and not too keen on gimmicks, I decided to set the wing sweep at an intermediate angle and glue the pylons in place.





So, looking at the overall concept, basically the kit has two main assemblies – the rear fuselage and wings, and the nose and cockpit. As individual sections the components fit together well, although some work is needed on the rear of the wing sweep boxes to blend in the gaps left by the ‘mechanical’ parts for the aforementioned wing sweep.

However, when you come to mate the nose to the fuselage... this is where the real fun starts!

There is a ‘huge’, (in modelling terms), step where the nose section mates with the upper deck of the fuselage, and this requires a lot of filler, to not only plug the gap but also to re-contour the whole top section in order to make a seamless blend. This requires some little patience!

Once the front and back had been successfully mated, the rest of the build was relatively straightforward, and the model was soon ready for painting.

The aircraft was first given a light coat of grey primer to check for any imperfections,

“...only Academy manufactures an F-111, of any sub-type, in 1/48 scale...”

then the undersides were airbrushed with Tamiya black and the whole thing left to dry overnight. Then the lower fuselage demarcation lines, the wing undersurfaces and tailerons were masked off and the aircraft sprayed in the three-tone TO 1-1-4 ‘South East Asia’ scheme using Aqueous Hobby Colors, FS 30219, FS 34102 and FS 34079.

Once thoroughly dry, the wheels were added and the whole model sprayed with Johnsons ‘Klear’ to produce a gloss finish. The Academy decals represent an ‘Operation El Dorado Canyon’ aircraft, and these settled down nicely using Micro Sol and Micro Set.

The underwing stores were provided by our sister publication ‘Scale Aviation Modeller Inter-

national’s Associate Editor, David Francis, courtesy of his copious ‘spares box’, and a pair of GBU-15s were selected, painted and added. The completed model was given a coat of ‘Life-color’ matt varnish and looked pretty much like an F-111!

Not a kit for the purist or the faint hearted, however if you are prepared to accept the inherent problems with the ‘Vark’, then the finished model at least gives the appearance of being an ‘Earth Pig’. **MAN**



A classic shot seen looking across the pilot at another F-111F



The rear section and wings 'pegged' to obtain a good join



As the canopy can be shown open only a little dry brushed detailing was added to the cockpit

'The Earth Pig Excels'

General Dynamics F-111F Aardvark

One of the most iconic and troubled aircraft of the 20th century was the General Dynamics F-111. However, its genesis, protracted and abortive naval development and its difficult 'childhood' with the Air Force eventually produced one of the finest low-level, all-weather precision strike aircraft of all time, as Andy Evans describes

In all, some 563 F-111s, in several variants were built, including the F-111A, F-111D, F-111E, and F-111F, as well as an FB-111A strategic bomber version of which ninety-six were F-111Ds, ninety-four F-111Es, and 106 F-111Fs, as well as seventy-six being built as FB-111s, which saw service with the Strategic Air Command until 1990 when they were converted to F-111Gs and assigned to Tactical Air Command.

All models had numerous problems, and only the F-111F actually fulfilled the original TFX design specification. This was less the fault of General Dynamics and more of those in the Pentagon whose cost-effective inclinations ironically produced one of the major aeronautical fiascos of the 1960s!

"In all, some 563 F-111s, in several variants were built, including 106 F-111Fs..."

The F-111F was the final F-111 version produced for the Tactical Air Command and differed from the F-111D in having more advanced electronics which were nevertheless simplified and more reliable. It carried the Mark IIB avionics suite which combined F-111D and FB-111A navigational and digital computer systems, (but excluded the F-111D's AN/APN-189 Doppler radar navigation set), plus numerous other FB-111A components such as the AN/APQ-144 attack radar and some simpler, less costly avionics systems used by earlier F-111s.

The APQ-144 attack radar of the F-111F had a new 2.5-mile display ring, made possible by a 0.2 pulse-width capability. The F-111F also featured an improved landing gear and was powered by a pair of 25,100lb TF30-P-100 turbofans, (although the first 30 had TF30-P-9s and were subsequently re-engined), giving some 35 percent more thrust than previous F-111A and E engines. The F-111F was also modified to carry the all-weather AN/AVQ-26 Pave Tack pod in its weapons bay and this system



A pair of 'Liberty Wing' F-111Fs head towards Scotland on a training exercise

provided an improved capability to acquire, track and designate ground targets at night for delivery of laser, infrared and electro-optically guided weapons.

In 1986, RAF Lakenheath based F-111Fs were used during 'Operation El Dorado Canyon', the raid on Libya, where aircraft bombed five targets in retaliation for terrorist attacks, losing one Aardvark in the process. It also played a major role in 'Operation Desert Storm,' (see this month's 'Air

Wars' supplement for more details), flying more than 2,500 missions.

Overall, the small sixty-six aircraft F-111F force was credited with 1,500 'kills' of Iraqi tanks and other mechanised vehicles, and the aircraft famously dropped two GBU-28s on a command and control bunker in Baghdad only days before



'48th TFW Deployed When Diplomacy Failed'

the ceasefire. One missed its mark, (because of faulty laser spotting), the other penetrated, destroying the bunker. Although F-111Fs flew primarily at night, aircrews flew a particularly notable daytime mission using the GBU-15s to seal the oil pipeline manifold sabotaged by Iraq

In 1994 the 524th Fighter Squadron became the only F-111F unit to convert to Pacer Strike modified F-111F aircraft, which incorporated a global positioning system and ring laser gyro into its avionics suite. As a result of the US Air Force decision to withdraw the F-111, the 27th Fighter Wing's seventy-four F-111E/F aircraft began retiring in late 1995 to be replaced the F-16C. **MAIN**

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A Lakenheath F-111F at the 'last chance' checks at the end of the runway. Note the red inside the wing flaps and the huge 'Pave Tack' pod on the belly



A good view not only of the aircraft, but of the ground equipment, circa 1992



Captain Mike Wallace, and 'Vark' driver and Desert Stormer in his office



Looking across the rear cockpit of the F-111F



Captain Steve 'Bear' Daughtry an F-111F 'Wizzo' (Weapons Systems Officer) check out the day's mission plan



An F-111 WSO peers into his radar scope



Still wearing its 'Vietnam' colour scheme the F-111F was always an impressive sight



Of note here are the Gulf War mission symbols, and the personalised nosewheel door



Looking up underneath an 'Aardvark' in flight. Note the ECM pod



Full afterburner, and this Lakenheath 'Vark' sends plumes of fire down the runway



A pretty impressive Gulf War mission tally here, with this F-111F being captured just after the aircraft returned to Lakenheath.



Note the Pave Tack pod fitted to the belly of this F-111F



Langnassen Doras

Following last month's 1/32 scale Fw 190D-9 feature, Neil Robinson builds a trio of 1/48 scale 'Doras' in late-war camouflage schemes

There appear to be basically two kits of the Fw 190D-9 currently available in 1/48 scale – from Tamiya and Italeri. The Tamiya mouldings are original to that company, but the Italeri offerings appear to owe their provenance to, and are either based upon, or licensed copies of, the Dragon/Tri-Master toolings.

Both the Tamiya and Italeri (sic) kits are good and accurate representations of the 'Dora neun'. Both are easy to build without any major fit problems, in fact the Tamiya kit virtually 'falls' together. However, the mainwheel well bays on both kits have to be clamped into place whilst the glue sets, to make sure they 'seat down' properly, which is no big deal. There is also the vexed question of whether the rear of the Jumo 213 engine could be seen from up inside the wheel bays, a feature that neither kit portrays...

Rapidly returning to the construction aspects, I also had to fill the wing-to-fuselage root joints with thin strips of plastic card – again not a major problem but something I didn't expect to have to do with such relatively modern tooling kits.

The Tamiya kit also has a bit of an 'identity problem' insofar as it looks as if Tamiya originally patterned the kit on two captured Fw 190Ds which are now in museums in the USA. It would appear that many years ago, the 'Doras', (an Fw 190D-9 and an Fw 190D-13), had their wings accidentally switched, which meant that the D-9 ended up with the D-13's wings and as such Tamiya only moulded the underside of their D-9's mainplanes with one cartridge case ejection chute, (for the centre-line engine-mounted, 20mm cannon of the D-13,

which fired through the propeller spinner), instead of the two cartridge case ejection chutes, for the cowl top 13mm machine guns of the D-9! *Ooops!* However, it only took a few moments to drill pilot holes and then cut open the second cartridge case ejection chute.

Then, upon checking other boxings of the Tamiya D-9 kit, I noticed that at some stage, Tamiya had made an attempt to rectify this 'problem' by what appears to be substituting the Fw 190F-8/A-8 lower wing half, which does feature two cartridge case ejection chutes, suitably modi-

'in stock' as it were, and was just in its polythene bags, (ie no box), so it looks as if I might have bought it second hand, (sorry 'previously-owned'), and forgotten about – it until now!

The thing is, apart from the broader chord *Einheitscheck* fin, and some photo-etch brass parts, the injection-moulded plastic parts are identical to the Italeri kit, although in this instance, the wing-to-fuselage root join was perfect, no filler whatsoever being needed!

As all three models are basically 'out-of-the-box' builds, (other than the odd bit of 'essential'

"Basically there have been three 1/48 scale kits of the 'Dora 9' produced – by Tamiya, Dragon and Italeri..."

fied, but I am not sure when this tooling modification actually occurred – so check your boxings.

The other 'problem' with the Tamiya kit is the mainwheels – they are too small in diameter. I replaced them with a pair of the SAM Publications resin 'solid hub' mainwheels from the 'Jabo 4: Fw 190A-5' set, but several other 'aftermarket' manufacturers also produce correct diameter 'solid hub' mainwheels for the Fw 190D.

The third model I made was from an original Dragon/Tri-Master boxing of a late series Fw 190D-9, with the broader chord *Einheitscheck* metal fin, that was fitted to the Ta 152. I haven't seen any Dragon/Tri-Master Fw 190Ds for sale in model shops for years, and I suspect that they are no longer generally available, at least not here in the UK. This particular kit was languishing in my loft,

detailing in the cockpit including adding etch brass seat belts), I needed to 'put a handle' on the exercise, to make it a little more interesting, so I decided to 'major' on the variations of the camouflage schemes...

Late-war Luftwaffe fighter schemes

The choice of camouflage schemes was by far the most interesting part of this project! To illustrate the almost chaotic situation of the *Luftwaffe*'s fighter camouflage schemes during the last six months of World War Two, (as alluded to in last



Fw 190D-9, 'Yellow 1', W.Nr 210003 of 3./JG 26, flown by Oblt Hans Dortenmann, February/March 1945, made from the Tamiya Fw 190D-9 kit



Fw 190 V53, W.Nr 170003, DU+JC, summer 1944

W.Nr 170003 was the first pre-production prototype of the D-9 modified from a Fw 190A-8 airframe. Camouflage was standard for the early D-9 series, comprising RLM 75 Mittelgrau and 83 Dunkelgrün on the upper surfaces with RLM 76 Lichtblau sides and under surfaces. Some panels were left in natural metal, such as the cowl top gun cover, with other areas in grey green primer (RLM 02?). As an evaluation test aircraft, it had a few specific features such as an additional small air intake on the starboard side of the engine cowl as well as cannon in the outer wing position, a legacy from its previous service as an A-8.

Of interest is the 'old style' national insignia



Fw 190D-9, W.Nr unknown, Stab IV/JG 3, Prenzlau, Germany, March 1945

This aircraft is generally associated with Oscar Romm, the Gruppe Kommandeur of IV/JG 3. The aircraft features the simplified late-war camouflage scheme, with large areas in the light blue grey RLM 76 colour with RLM 81 Braunviolet and 82 Hellgrün on the topsides. The fuselage spine appears to have been finished in RLM 81 only. Note the mainplane under surfaces have been left in natural metal with the forward section in RLM 75 Mittelgrau



Fw 190D-9, W.Nr 211941, Stab I/JG 6, Bayreuth-Bindlach, Germany May 1945

This aircraft featured light mainplane upper surfaces, possibly RLM 76 Lichtblau, with RLM 83 Dunkelgrün disruptive pattern. The fuselage spine is in RLM 82 Hellgrün and 83 Dunkelgrün with a sparse mottling of RLM 81 Braunviolet on the fuselage sides. Note the methanol water boost 'MW 50' inverted yellow chevron marking, natural metal fuselage extension 'plug' and the discoloured area under the double chevron, indicating a painted-out previous identity numeral



Fw 190D-9, W.Nr 500570, 'Blue 12' of 8/JG 6, Fürth-Atzenhof, Germany May 1945

Another D-9 whose wing upper surfaces had RLM 76 Lichtblau areas, this time with RLM 81 Braunviolet disruptive pattern. The fuselage spine is in RLM 81 and 83 Dunkelgrün, with the blue/green Sky shade of RLM 76 on the fuselage sides and underside of the fuselage centre section. The under surfaces of the wings are in natural metal with the forward section in either RLM 81 or RLM 75 Mittelgrau (as illustrated). The main gear doors were also in the same colour. Note the standard RLM 76 shade of the rudder and the areas of red oxide primer



Fw 190D-9, W.Nr 210051, III./JG 54, Bremen-Neuenlanderfeld

This D-9 was delivered to III./JG 54 but whether it ever had staffel numerals applied or anything about its further service history is unknown. As an early production machine, it is still finished in RLM 75 Mittelgrau and RLM 83 Dunkelgrün upper surfaces with RLM 76 Lichtblau fuselage sides and under surfaces. Note the irregular but well defined demarcation line on the fuselage spine and the softer mottling on the fin and rudder



Fw 190D-9, W.Nr 211123, unknown unit, March 1945

This aircraft was found abandoned by Soviet troops at Marienburg in March 1945. It is finished in the late-war upper surface scheme of RLM 82 Hellgrün and RLM 83 Dunkelgrün with RLM 76 Lichtblau fuselage sides and under surfaces. The fuselage sides, fin and rudder were sparsely and very softly mottled. The under surfaces of the wings are in natural metal with the forward section in RLM 75 Mittelgrau, including the top portion of the main gear doors. Note the natural metal canopy hood fairing and areas of the rear fuselage sides in a grey green colour



Fw 190D-9, W.Nr 401392, 'black 5' from Stab/JG 26, Flensburg, Germany May 1945

This 'Dora' was captured and evaluated by the US Army. It was possibly finished with RLM 76 Lichtblau and RLM 83 Dunkelgrün wing upper surfaces. Fuselage spine was in RLM 81 Braunviolett and RLM 83 Dunkelgrün with very little mottling on the the RLM 76 Lichtblau fuselage sides. The mainplane under surfaces have been left in natural metal with the forward section as well as the main gear doors in RLM 75 Mittelgrau. Ailerons are in RLM 76. Rear fuselage carries the well known black and white fuselage i/d band, indicating JG 26. Note the simple plain black wing underside cross



Fw 190D-9, W.Nr 500636, 'white 16', possibly from I./JG 2, Bayreuth-Bindlach, Germany, May 1945

This was another example of the application of the blue/green Sky shade of RLM 76 on the fuselage sides and underside of the fuselage centre section. The upper surfaces of the wings and tailplane are in RLM 76 Lichtblau with RLM 81 Braunviolett camouflage. The fuselage spine is mainly in RLM 81, very heavily applied around the tailplane area, with patches of what appear to be RLM 82 Hellgrün. The under surfaces of the wings were in natural metal with the forward section in either RLM 81 or RLM 75 Mittelgrau (as illustrated). The main gear doors were also in the same colour. Note the engine cowl panels still in natural metal and the rudder in the standard RLM 76 shade

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Fw 190D-9, 'Blue 12', W.Nr 500570 of 8./JG 6, Fürth, Germany, April/May 1945, built from the Italeri boxing of the original Dragon/Tri-Master tooling



month's 1/32 scale coverage), I initially planned to finish each one of my models in a variation of what may loosely be termed the three 'late war' combinations of RLM colours used during the last six months of World War Two.

Basically, the three basic 'late war' schemes, were:

- Medium grey RLM 75 *Mittelgrau/Grauviolett* and dark green RLM 83 *Dunkelgrün* upper surfaces with pale blue/grey RLM 76 *Lichtblau* undersides, which could almost be described as the 'standard' factory scheme towards the end of 1944.

shade and the other, (or others?), a blue/green shade similar to RAF Sky, which appears to have been the result of changes in the composition of the pigments in the make up of the RLM 76 paint.

(Ed Note: See Michael Ullmann's article on modelling Erich Hartmann's Bf 109K-4 in the January 2006 issue of 'MAM', Vol 5/1 in which he explains about the greenish variations of RLM 76 *Lichtblau*, and his article in last month's issue about the late-war Fw 190D paint scheme he applied to his 1/32 scale model).

As is now accepted, most of the aircraft were built using various sub-contractor's parts, which

fuselage extension 'plug'), and the fin and rudder, as well as the wing upper surfaces in any of the available camouflage colours, was also rife. Talk about a modelling minefield!

With all this taken in to consideration, modelling from a photograph might be considered mandatory, but then there is the problem of interpreting the b&w, (and rarer colour), wartime photographs.

In the end, I decided to rely on the opinions and findings of others, much more knowledgeable on the subject than me, and selected particular aircraft and schemes described in the two wonderful volumes of *Focke-Wulf Fw 190D Camouflage & Markings* Parts 1 and 2 by Marc Deboeck, Eric Larger and Tomas Poruba, JaPo Publications, 2005 and 2007 respectively, and the equally essential *The Focke-Wulf Fw 190 Dora - Volume One*, by Jerry Crandall, Eagle Editions Ltd, 2007.

All three of these books cannot be recommended highly enough for anyone making or contemplating building models of Fw 190Ds, (see book reviews in last month's, February 2008 Vol 7/2, issue).

After several, (rather enjoyable, if sometimes confusing), days of sifting through these three books, I eventually decided upon finishing my three models as:

- Fw 190D-9, 'Yellow 1', W.Nr 210003 of 3./JG 26
- Fw 190D-9, 'Blue 12', W.Nr 500570 of 8./JG 6
- Fw 190D-9, 'Black 6', W.Nr 500645 of 12./JG 2

"I also used a new product on the market, called 'Pro Modellers Weathering Wash' on this trio..."

- The 'greens' scheme, introduced circa late-1944, which comprised medium green RLM 82 *Hellgrün* and dark green RLM 83 *Dunkelgrün* upper surfaces with pale blue/grey RLM 76 *Lichtblau* and natural metal undersides.
- The 'brown/green' scheme, introduced circa early-1945, which comprised medium brown RLM 81 *Braunviolett* and medium green RLM 82 *Hellgrün* upper surfaces with pale blue/grey RLM 76 *Lichtblau* and natural metal undersides.

At least they were the basics...

Variations in the variations (!) included large areas of the aircraft's mainplane undersides being left in natural metal, (as was, occasionally, the rear fuselage extension 'plug'), although the ailerons, (and sometimes the flaps), were invariably painted in RLM 76 *Lichtblau*. Talking of which, there appear to have been at least two shades of RLM 76 *Lichtblau*, one the officially accepted pale blue/grey

added another level of variation to the 'standard' paint schemes, as each sub-contractor may have been using up previous 'older' paint; had paint supply problems and used what they could get, or might even have had their own particular painting style idiosyncrasies, such as Junkers who supplied many of the Jumo 213 engines as a complete unit with pre-painted cowlings panels!

All these variations occurred whilst the aircraft were being manufactured - which is not to mention what then happened to the aircraft once they arrived at their operational units! To help conceal the aircraft on the ground, the leading third of the mainplane undersides was often oversprayed in one of the upper surface camouflage colours, often the medium grey RLM 75 *Mittelgrau/Grauviolett*, as too were many aircraft's main undercarriage leg covers. Overspraying of the fuselage sides, (including the often 'left unpainted' rear



Fw 190D-9, 'Black 6', W.Nr 500645 of 12./JG 2, Altenstadt, Germany, May 1945, made from an original Dragon/Tri-Master late series Fw 190D-9



Fw 190D-9, 'Yellow 1'

To make things easier, I will go through the colour schemes, and the invariable variations, model by model. However, as a general feature, I used Hannants Xtracrylix acrylic paint throughout, and learned two valuable lessons in the process. Make sure you ALWAYS apply Xtracrylix over a primer coat, (I invariably use Halfords Grey Auto Primer), and ALWAYS thin Xtracrylix with Xtracrylix Thinners – which will mean your Xtracrylix paint will not lift when you remove your Tamiya masking tape and your airbrush will not clog at every conceivable opportunity.

You may have guessed that I did not heed my own advice, and that this advice is retrospective in my case... *Doh!*

The paints I used were: XA1207 'RLM 75 *Grauviolett*'; XA1206 'RLM 76 *Lichtblau*'; XA1210 'RLM 81 *Braunviolett*'; XA1211 'RLM 82 *Dunkelgrün*', (the RLM number for which should be RLM 83); XA1212 RLM 83 *Lichtgrün*, (the RLM number for which should be RLM 82 – as you may have noticed, Hannants have accidentally transposed the RLM numbers for these two colours); and XA1007 RAF Sky. The final surface finish on the models was purposely left slightly 'satiny', to reflect the semi-satin finish seen on *Luftwaffe* aircraft of this period, although it was toned-down a bit after I applied all the weathering, exhaust stains and paint chipping!

I also used a new product on the market, called 'Pro Modellers Weathering Wash' on this trio.

Developed by husband and wife team, Phil and Julie Flory, it is a natural clay-based medium, primarily designed for enhancing panel lines and weathering effects. You simply paint it on, allow it to dry and then remove the excess with a damp cloth. It can be applied to all paints, acrylic and enamel, and does not stain. It is available in a Light Wash and a Dark Wash at the moment, and comes in 50ml plastic, screw top bottles.

much and give the model a 'Capo de Monte' effect, this wash is 'just' right.

After leaving the 'Pro Modellers Weathering Wash' on overnight to dry, the next morning I carefully removed the excess wash with a moistened damp, (not too wet), kitchen roll tissue, the last few sweeps being in the direction of the air-flow, which left a very subtle, neutral dark grey, residue in all the panel and control surfaces lines

"I planned to finish each one of my models in variations of the 'late war' RLM colour schemes..."

I've never really been a proponent of applying washes to models. I was always wary of them – a fear in the back of my mind that after applying my carefully painted camouflage scheme, what would happen if I couldn't get all the 'wash' off, I would have ruined a model. No such worries here! After watching the promotional 'real time' videos and reading all about the product, and other modellers experiences using it, on the company's excellent website, (www.promodeller.com), I threw caution to the wind and dived in, or more accurately, applied the Dark Wash with a broad soft brush.

I am pleased to report that I am now a 'Pro Modellers Weathering Wash' convert! The effect was exactly what I had hoped for – subtle but effective. Whereas I have seen some washes applied to some models that are just a bit 'too'

with just an 'indication' of streaks flowing back from some of the panels.

I like my models to look 'operational', and the wash also seemed to slightly 'dirty-up' the paintwork and somehow helped to tone down and blend the colours into one another in a very convincing scale effect. I have to admit though, it worked better on the slightly deeper, more well defined, panel lines of the Tamiya kit, (those on the Dragon/Italeri kit being just that bit shallower), but overall, the 'experiment' was a success and I shall use 'Pro Modellers Weathering Wash' on all my models from now on! It is stocked by Hannants, Antics and Model Hobbies in the UK, but new and overseas outlets are currently being sought.

On to the individual models' colour schemes now.



Fw 190D-9, W.Nr 600651, 'white 15', possibly from I./JG 2, Straubing, Germany May 1945

This example was probably finished in the 'two greens' scheme of RLM 82 Hellgrün and 83 Dunkelgrün upper surfaces with RLM 76 Lichtblau fuselage sides and under surfaces with the exception of the under surfaces of the wings which were in natural metal with just the forward section in RLM 76. The fuselage sides were very densely mottled in RLM 82 and 83. Note the small size fuselage cross in black and white



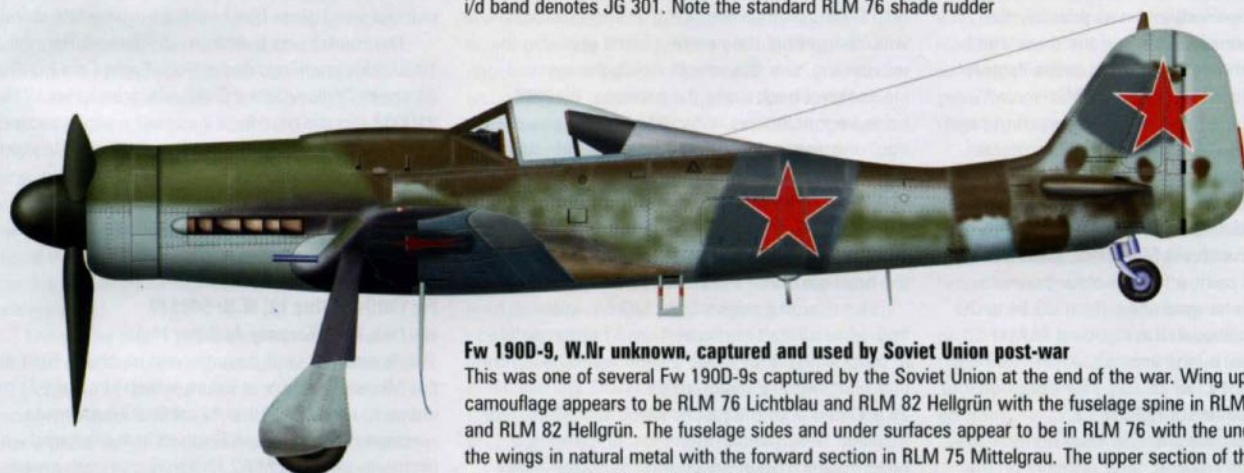
Fw 190D-9, W.Nr 600434, 'yellow 4', of 11./JG 2, Germany, May 1945

Another example probably finished in the 'two greens' scheme of RLM 82 Hellgrün and 83 Dunkelgrün upper surfaces with RLM 76 Lichtblau fuselage sides and under surfaces with just the rear part of the wing underside in natural metal. In this instance, the fuselage sides were very lightly mottled in RLM 82 and 83. The aircraft had JG 2's yellow/white/yellow i/d bands applied following the angled rear fuselage extension plug panel lines. Again note the small size fuselage cross in black and white



Fw 190D-9, W.Nr 500408, 'white 12' of 5./JG 301, Bad Langensalza, Germany, May 1945

This aircraft illustrates the mixture of the camouflage colours applied to late war manufactured Fw 190Ds. The upper surfaces of the wings and tailplanes are in RLM 81 Braunviolet and RLM 82 Hellgrün, with a mainly RLM 81 fuselage spine with just small areas of RLM 82. The sides and under surfaces of the engine cowlings were in the standard RLM 76 Lichtblau shade with the rear fuselage and fin in the blue/green Sky shade of RLM 76. Underside of the wings are natural metal with RLM 75 front section. The rear fuselage yellow and red i/d band denotes JG 301. Note the standard RLM 76 shade rudder



Fw 190D-9, W.Nr unknown, captured and used by Soviet Union post-war

This was one of several Fw 190D-9s captured by the Soviet Union at the end of the war. Wing upper surface camouflage appears to be RLM 76 Lichtblau and RLM 82 Hellgrün with the fuselage spine in RLM 81 Braunviolet and RLM 82 Hellgrün. The fuselage sides and under surfaces appear to be in RLM 76 with the under surfaces of the wings in natural metal with the forward section in RLM 75 Mittelgrau. The upper section of the main gear doors were also in RLM 75. The Soviets overpainted the German national insignia with standard dark blue grey AMT-12 paint, as used at the time on VVS fighters, and applied red stars with white border over the top

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Fw 190D-9, 'Blue 12'

Fw 190D-9, 'Yellow 1', W.Nr 210003
of 3./JG 26, flown by Oblt Hans Dortenmann,
February/March 1945

Werknummer 210003, a Focke-Wulf Sorau-built machine, was one of the most 'long-lived' Fw 190D-9s ever. It was the first Fw 190D-9 actually delivered to the *Luftwaffe* in September 1944, and was still in operational service at the cessation of hostilities in May 1945, when its pilot destroyed it to avoid it being taken into enemy hands. It was flown by the same pilot, *Oblt* Hans Dortenmann, throughout this period, and was possibly the most 'standard-finish' aircraft of the three that I built, being more or less finished in the 'factory' scheme of medium grey RLM 75 *Mittelgrau/Grauviolett* and dark green RLM 83 *Dunkelgrün* upper surfaces with pale blue/grey RLM 76 *Lichtblau* undersides.

Fortunately, the aircraft was well chronicled, from its entry into *Luftwaffe* service in September 1944 to its destruction in May 1945, and went through several paint scheme/colour permutations, and even changed unit – from JG 54 to JG 26. Originally finished in the standard RLM 75/83/76 scheme, by the time 12./JG 54 had been re-designated as 14./JG 26 and then morphed into 3./JG 26, the medium grey RLM 75 *Mittelgrau/Grauviolett* areas, at least on the fuselage spine/engine cowling, (and possibly on the wings/tailplanes too), had been overpainted in medium green RLM 82 *Hellgrün*. I 'repainted' the fuselage spine/engine cowling 82/83, but 'kept' the

wings and tailplanes in the original 75/83 colours.

The fin and rudder, and possibly the engine cowlings underside, had been painted yellow RLM 04 *Gelb* whilst in JG 54 service, (to act as a formation aid to *Oblt* Dortenmann's fellow *Staffel* members), which was kept throughout its JG 26 service, but was starting to look a bit 'worn and distressed' by April/May 1945.

This particular Fw 190D had the area of cowlings panelling around the exhaust manifolds painted in black – a feature seen on many Focke-Wulf built D-9s. Another 'feature' that I noted whilst I was 'distressing' the paintwork and applying the weathering, was the way in which the exhaust stains travel back along the fuselage. Probably because the Junkers Jumo 213 engine 'power egg' unit was manufactured as a separate item, there must have been a slight 'step' where the cowlings panels meet the fuselage proper, and this caused the exhaust stains to be darker on the engine cowlings panels than on the remainder of the fuselage under the cockpit.

The aircraft's original, (12./JG 54), plain red individual aircraft numeral '1' had been repainted in black with a thin white outline when the aircraft and pilot were re-assigned to 14./JG 26, and JG 26's 'Defence of the Reich', black and white, rear fuselage *Geschwader* identification band had been applied, upon which the *IV Gruppe* 'welle' (wave) had been painted, also in black with a thin white outline.

Then, in late March 1945, when *Oblt* Dorten-

mann was appointed *Staffelkapitan* of 3./JG 26, the numeral was overpainted again, in yellow with a thin black outline. The *IV Gruppe* 'welle' was also painted out at this stage, but could still be faintly seen – and this is how I finished my model.

I fitted 'Yellow 1' with a 'smooth' late-war 300 litre fuselage centre-line drop tank, (from the kit), which I painted the standard pale blue/grey shade of RLM 76, ie the same shade RLM 76 as the fuselage undersides, suitably covered in fuel spillage leaks and dribbles. The propeller spinner was painted semi-gloss black with a broad white spiral.

The model was built from the Tamiya Fw 190D-9 kit, markings came from Eagle Cals EC48-21 sheet, 'Yellow Tailed D-9s' which includes W.Nr 210003 – in the markings it carried when operated by 12./JG 54 as 'Red 1', and then later as it looked as 'Yellow 1' when *Oblt* Dortenmann became *Staffelkapitan* of 3./JG 26, which is the option I used, simply applying and then lightly overpainting the *IV Gruppe* 'welle'.

Fw 190D-9, 'Blue 12', W.Nr 500570
of 8./JG 6, Fürth, Germany, April/May 1945

This is another well-documented machine, built at the *Mimetall* factory at Erfurt, which I initially chose to model as 'Blue 12' of 8./JG 6 as it was supposed to have been finished in the 'greens' – (medium green RLM 82 *Hellgrün* and dark green RLM 83 *Dunkelgrün*) – scheme, however – (there always seems to be an 'however' with late-war *Luftwaffe* schemes doesn't there!) – there is con-



Fw 190D-9, Black 6'

flicking evidence about the darker colour of the two on the fuselage upper surfaces, which might well have been RLM 81 *Braunviolett*!

Undaunted by this 'minor' setback to my selected colour scheme plan, I then went on to discover that the wing and tailplane upper surfaces may well have been finished in RLM 76 *Lichtblau* and medium brown RLM 81 *Braunviolett*. That completely hijacked my 'greens' scheme plans, but, *onwards and upwards*!

Added to this *débat* were various areas of the port wing root that were in a medium grey colour, probably RLM 75 *Mittelgrau/Grauviolett*, and (battle damage?) 'patches' on the starboard wing leading edge and the leading edge of the fin, in what might have been RLM 02 *Grau* primer. There was a 'patch' of a dark shade of green, wrapped around the top of the rear fuselage just in front of the fin, and red/brown primer around the lifting holes in the rear fuselage and in the middle of the port fuselage *Balkenkreuz*. And that was just the upper surfaces – wait until we get to the undersides!

There was also a mix of the standard pale blue/grey, and the blue/green (Sky) variation, RLM 76 *Lichtblau* on the fuselage sides and under surfaces with bare aluminium sections on the mainplane undersides. The leading third of the mainplanes was overpainted in – wait for it – brown RLM 81 *Braunviolett*, as too were the main undercarriage leg covers, with various underwing panel lines sealed in red/brown primer.

In fact 'Blue 12' wasn't finished in anything like the 'greens' scheme at all – but it did look rather striking!

I also fitted this 'Dora' with a 'smooth' late-war 300 litre fuselage centre-line drop tank, (from the kit), which I painted in the blue/green shade of RLM 76 to match the fuselage underside centre section. The propeller spinner was again painted semi-gloss black with a slightly narrower white spiral.

The model was built from the Italeri boxing of the original Dragon/Tri-Master tooling. Markings were made up and adapted from my spares box(es), mainly from generic code number and national markings sets. The numeral '2' was particularly difficult to replicate and had to be made up from two different styles of '2's spliced together.

Fw 190D-9, Black 6', W.Nr 500645 of 12./JG 2, Altenstadt, Germany, May 1945

Werknummer 500645 was one of the few 'Doras' fitted with the broader chord *Einheitscheck* fin, and was supposedly finished in the 'late war' medium brown RLM 81 *Braunviolett* and medium green RLM 82 *Hellgrün* scheme – well at least the fuselage upper surfaces were, with a nice big area of RLM 81 around the cockpit area and the brighter green RLM 82 on the cowlings and rear fuselage.

The wings and tailplanes however, (that 'however' again!), appear to have been finished in medium grey RLM 75 *Mittelgrau/Grauviolett* and dark green RLM 83 *Dunkelgrün*, with ailerons,

(replacements from a different aircraft perhaps?), in slightly lighter, (weathered?), shades of the same colours. There were areas of an unidentified 'medium grey' in patches along the mainplane leading edges and a 'patch' of RLM 81 *Braunviolett* along the port wing root. The rear sections of the wing root fillet may also have been left in natural aluminium.

The fuselage sides and under surfaces were again a mix of the 'standard' pale blue/grey, and the blue/green (Sky) variation, RLM 76 *Lichtblau*, with bare aluminium mainplane undersides. The leading third of the mainplanes was again overpainted, this time in medium grey RLM 75 *Mittelgrau/Grauviolett*, as too were the main undercarriage leg covers.

I fitted this 'Dora' with a late-war cylindrical 300 litre fuselage centre-line drop tank, (modified from the AB 250 bomb in the Italeri kit), which I painted dull aluminium. Again the propeller spinner was painted semi-gloss black, this time with a fairly broad white spiral.

The model was made from an original Dragon/Tri-Master boxing, (or at least the polythene bags that the parts were in), of a late series Fw 190D-9. Markings again came, and/or were adapted from, my spares box(es), mainly from generic code number and national markings sets. **MAM**

Next Month

Neil Robinson builds a pair of modified 'Doras' using the SAM Limited resin D-11/D-13 conversion sets.

One Man's War 2

Prompted by the series of wartime photos we ran in the October and November 2005 issues of 'MAM', Ra'anan Weiss, (of IsraDecal fame), has sent in the details and photos of one of Joe Currie's RAF contemporaries, Yosef Leshem...

Yosef Leshem was born in 1918 as Yosef Shmeltz in southern Germany. His civilian profession was as a carpenter. His first touch with aviation was during 1934, a year after Hitler showed up and was planning to turn the continent into a living hell.

At that time, the Hitler Youth were flying gliders from the southern German hills. Some of the landings resulted in the gliders' wooden airframes being broken and professional carpenters were needed to fix them. This situation gave Yosef plenty of experience in dealing with wooden aeroplanes but also showed him that the forthcoming future in Europe would not be a good place for a Jewish carpenter.

His family got a certificate from the British Mandate to go to Palestine when Yosef was 17. The family decided to go as fast as they could. However, even in Palestine, life wasn't easy. Yosef worked as a carpenter in Tel-Aviv and his love of aeroplanes made him volunteer for the RAF, like so many Jews then living in Palestine.

After his wood working abilities were



Yosef Shmeltz (as he was then), in RAF service as a 'Flight Rigger' at Abu-Suir in Egypt, circa 1941

assessed at Ramle Air Base, he was posted to Abu-Suir in Egypt as a 'Flight Rigger'. His previous skills in aeroplane repairs came to the fore and he started working on Lysanders and later other wooden-framed RAF aircraft.

Like so many families that had fled Germany, Yosef owned a personal camera and all the accompanying photographs you see in these pages were taken by Yosef in Egypt and North Africa, mainly during the Second World War.

When the war was over, he was released from RAF service and with the subsequent establishment of the state of Israel he became a Senior Mechanic in the Israeli Defence Force/Air Force, serving at first with the famous 101 Squadron.

Many of the early known IDF/AF photos were taken by Yosef, who, during that period, changed his last name to the native Israeli name 'Leshem', which had most of the Hebrew letters in his original name Shmeltz. He served with IDF/AF until 1966 and retired as a Lieutenant Colonel. Today he is 88 years-old and lives in Ramat-Hasharon. **MAM**

Czech Airlines DC-2, SP-ACK, possibly at Cairo Airport pre-war



Fairey Gordon Mk I, K2730. Note the broken front outer interplane strut



Yosef looking ruefully at Hurricane Mk I, Z4322, with collapsed undercarriage after a forced landing in the desert, whilst in No 274, 33, 451 or 237 Sqn service, (depending upon the date when the photo was taken). Note that the aircraft is in 'Desert Camouflage' – possibly Dark Earth and Mid Stone with the serial number on what appears to be a patch of the original Dark Green



Unidentified RAF Blenheim Mk IV in what appears to be the Dark Earth/Dark Green/Sky Temperate Land Scheme but devoid of any unit markings.



What appears to be a captured ex-Luftwaffe Ju 52 in crudely-applied RAF roundels

Tropicalised Hurricane Mk I, possibly Z4783, still in Temperate Land Scheme. Note the 44 gallon underwing long range tanks and fairings on the ground under the wings



Ferry flight mishap! Tropicalised Hurricane Mk I fitted with 44 gallon underwing long range tanks with the white rear fuselage decking (and fuselage numeral '3'), possibly on the Takoradi ferry flight delivery run, following a landing mishap



Unidentified tropicalised Hurricane Mk IIc, minus its cannon barrels

Another crashed Hurricane Mk I – with annoyingly unreadable serial number



Yosef Shmeltz, 'Flight Rigger' as he was then, sitting on the cowling of a Hurricane Mk IIc

RAF Harvard Mk II. Note the long exhaust manifold and the brightly polished natural metal propeller blades



Yosek and colleagues in front of a tropicalised Hurricane Mk IIc fitted with 44 gallon underwing long range tanks

Gauntlet Mk II, K7838 coded 'R' with the Greek Flight at Gaza, Palestine, after hitting Hurricane Mk IIb, BP322 in July 1942



RAF Hurricane Mk I, (serial unreadable), in what appears to be Dark Green and Mid Stone 'desert' scheme; Wellington Mk II coded 'S' and a Turkish Air Force Spitfire Mk I or Va, code '2', share a section of desert airfield somewhere in Egypt!

Unidentified Douglas Boston Mk III, with a very broken wing!



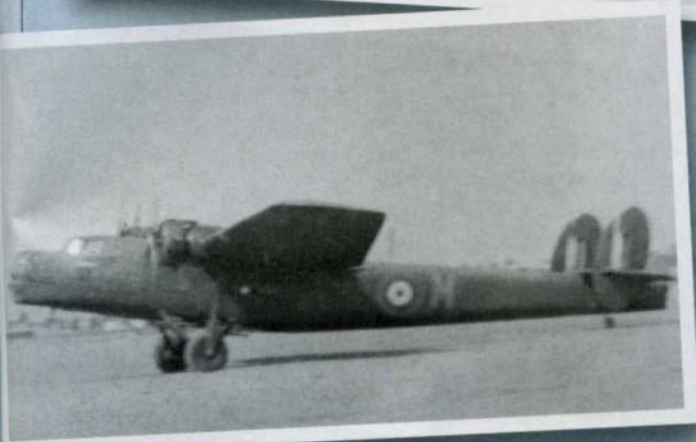
Beaufighter Mk Ics of No 252 Sqn photographed not long after the unit's arrival in Egypt in December 1941. Note the aircraft still appear to be finished in the Dark Earth/Dark Green Temperate Land Scheme upper surfaces with Skay undersides



Possibly a Canadian Car & Foundry-built Hurricane Mk I, in what appears to be in the Z7??? series range, about to land. Note the Night port underwing with Yellow outlined roundel and Sky (?) Fighter Command band around the rear fuselage contrasting with the fuselage under surface colour



Yosef sitting on the cowl of possibly the same Hurricane Mk IIc. Note the rectangular rearview mirror and the light coloured anti-slip section on the wing root



Unidentified Bristol Bombay transport coded 'M' with what appears to be Night under surfaces...

One of the ex-Greek order, F4F-3As taken over by the British after the fall of Greece and allocated to No 805 NAS, Fleet Air Arm, for shore-based use in the Western Desert. Unfortunately the serial number is unreadable but would possibly have been in the AX-range. Note the overall US applied Non Specular Light Gray scheme



Vickers Vallencia transport in full desert scheme markings



A captured Messerschmitt Bf 110E, repainted in British markings

Yosef Shmeltz and colleague in front of a Blenheim Mk IV – note the twin barrels of the rearward firing nose underside guns



A crashed Turkish Air Force Blenheim Mk IV

Curtiss Tomahawk Mk IIB, AK428, coded KJ-K of No 4 Sqn SAAF, with what appears to be a winged Springbok on the nose



Hurricane Mk Is and IIs, of No 213 Sqn, at Ismalia, Egypt, in late 1941, finished in overall Special Night for Night Defence of the Suez Canal. The nearest Hurricane code 'H' is a Mk I and appears to be in the W???? serial range



Gloster-built Hurricane Mk I, Z4558, possibly in service with the Rhodesian Air Training Group at the time the photograph was taken, finished in the Dark Earth/Mid Stone upper surface Desert Scheme



Another shot of the Turkish Air Force Spitfire Mk I/Va – perhaps on its delivery flight?

Dramatic shot of a Hurricane crash landing with the port undercarriage leg collapsed



A Squadron of Hurricane Mk IIcs, 'somewhere in the desert' – possibly No 213 Sqn at one of their Landing Grounds behind enemy lines?



Blenheim Mk IV, possibly R3608 of No 11 Sqn, which crashed on landing at Haifa, Egypt in June 1941



Turkish Air Force Heinkel He 111F, coded 2214

Rootes-built Blenheim Mk V, BA855, (possibly with BA854 behind), built for the Turkish Air Force, in March 1943



Nose of a tropicalised Hurricane Mk II, with a name that meant something completely different than it does today... Note the camera gun port in the leading edge of the starboard wing

Swords into Ploughshares 5



Box art and contents



Grumman's Hellcat has its claws trimmed

Following on from Trevor Pask's comparison assessment in last month's issue, Mike Robson now builds the 1/72 Hobby Boss Hellcat... in civilian guise!

For anyone who has been following this occasional series, the Hellcat 'conversion' is by far the easiest as it requires little more than a civilian paint job and a snazzy decal treatment.

In recent months I have made a couple of models using some unusual decals marketed under the name of 'DRAWdecal' which are made by an American enthusiast called Greg Drawbaugh. I have been highly impressed by their quality and also by the interesting choice of subjects, many of which are aimed at the airline modeller market. Not long ago I made a Matchbox Twin Otter using Greg's decals and he was kind enough to feature photos of this on his web page. It was through admiring my work on his web page, (fame at last!), that I discovered a sheet which depicts a civilian Hellcat of all things!*

The military Hellcat is well enough known so as not to require any further description from me. The particular subject of this feature is Grumman F6F-3 Hellcat, BuNo 08825, which served with VF-37 on the US escort carrier USS Sagamon where it was flown by a Lt Jim Ritchie, who scored three 'kills' with the aircraft for which he was awarded the Navy Cross.

It appears to have come on to the US civil register in 1959 when it was owned by one Michael Couthes and was based in Hayward, California for a number of years. It was then sold to a gentleman called Wayne Fowler who operated it out of Shaw Island, Washington State, and thence to Charles F Willis, CEO of Alaska Airlines, during which time it received its distinctive colour scheme. Regrettably, I have been unable to find out much about its life with Alaska Airlines but it seems safe to assume that it was not used on the airline's scheduled services!

BuNo 08825 was sold in the mid-1970s to Willard Compton of Canby, Oregon. Returning from an air show in June 1977, the aircraft was substantially damaged in a crash at Canby. The accident report states that an incorrectly assembled fuel transfer selector was the cause. Although the aircraft is deemed to be restorable, reports suggest that Mr Compton shows little interest in such a project, moreover, he will not sell the Hellcat. Pity!

Modelling the civilian kitty

There are several kits of the Hellcat around in all the popular scales but I chose the 'new kid on the block', in the shape of the Hobby Boss recent release which, by happy coincidence is an F6F-3. Produced in China, the Hobby Boss range currently includes a wide selection of many of the most popular single-engined World War Two fighters in 1/72 scale. They are attractively boxed and currently retail for under £4.00 in the UK.

It is on opening the box that one receives the first surprise. The model is already half built! Components are displayed, chocolate box fash-

ion, in a vacuum moulded insert. The fuselage is complete but for the engine cowling and cockpit interior; the wings and lower fuselage section come as one piece and there are two small sprues with such items as cockpit floor, tailplane halves, wheels, propeller etc. A transparent sprue contains the canopy, a gunsight and two fuselage windows. A decal sheet is included which depicts the military Hellcat in the services of two US Navy units.

A kiddie's toy? Maybe not! The quality of moulding is superb. The aircraft scales out accurately with published dimensions and it allows the modeller to complete a first class model in the minimum of time. If one was contemplating a multiple display of one type then these little kits would be a godsend. Doubtless they are aimed at the younger modeller and, frankly, I think they have got the recipe just right and I sincerely hope that Hobby Boss might be responsible for bringing some badly needed youngsters into the hobby. I would, however, suggest that the instruction sheet requires improving. There are at least six parts labelled 'A1' and I could not find a home for part 13!

Construction starts with painting the cockpit interior which can be accessed from below. Having no information on the civilian colour scheme I assumed that the aircraft's interior would be what was known as 'Grumman Grey' which approximates to FS 36440 and is replicated adequately by Humbrol 129 Light Gull Gray. No instrument panel is supplied so I used pieces of generic decal from I know not where.

I assumed that Mr Willis, unless he had evil intentions, would not have required the wing mounted guns or gunsight so these were discarded. The drop tank and its shackles can also be



Contents displayed



Layout of major components before assembly



Cockpit assembly



Model prior to painting. Note minimal filler used

consigned to the spares box, not forgetting to fill its rear mounting hole. Although the upper fuselage comes complete rather than in the conventional two halves, there is still a tiny central moulding line to be removed which takes but a second.

The seat was then mounted on the cockpit floor and painted steel with Olive Drab upholstery before I fashioned a seat harness from wine bottle foil, which was painted light brown. This locates positively into the upper fuselage. Following this, the one-piece wing and lower fuselage can be cemented to the top section. There are large locating pegs for this operation and the whole thing clicks together with only a tiny smear of filler required between wing and fuselage.

The tailplane halves followed as did the previously completed engine cowl and propeller assembly. Curiously, the instructions do not show any means of retaining the propeller but a quick search of the sprue revealed part 22 which was obviously intended for this role. Everything fitted with Swiss precision.

The undercarriage, which is nicely moulded, was quickly assembled and painted silver with a touch of light grey to tone down the finish. The



tape and stuffing tissue into the engine cowl and cockpit aperture, I gave the model two coats of my usual aerosol Halfords Acrylic White Primer followed by two coats of the same manufacturer's

ferent technique to the mass produced variety. Firstly the sheet needs a coat or two of Johnson's 'Klear', (or its American equivalent, 'Future'), following which the decals need to be cut out close to their outlines. Although very thin, they went on without any problem and it seems that decal solvents were unnecessary. The only other decoration required was to add the fuselage hand and footholds, which I did using tiny pieces of red decal.

The engine crankcase was painted gloss red and the cylinders matt black, drybrushed with Humbrol Steel. A small amount of weathering in the exhaust areas was required, which I applied by airbrush, using Tamiya Smoke through a cardboard mask. The final operation was to add the canopy which I framed using strips of decal film painted white and then sprayed the finished model with a coat of Xtracolour Acrylic Gloss Varnish.

The purists amongst the readership will no doubt choke on their cornflakes to see a Hellcat painted in colours other than Gloss Sea Blue, but you can't deny that this must have been a most attractive aeroplane and a useful promotional tool for Alaska Airlines all those years ago... **MAN**

***Incidentally, the DRAWdecals sheet is also available in 1/48 and 1/32 scales.**

References used

- 'Aircraft of World War II' by Kenneth Munson. Ian Allan Publishing
- 'Warbirds Worldwide Directory' by John Chapman and Geoff Goodall, edited by Paul Coggan. Warbirds Worldwide
- www.drawdecals.com
- www.warbirdregistry/f6f-08825.html

Sincere thanks are due to Creative Models, the UK importers of Hobby Boss, who kindly supplied me with a replacement cockpit canopy when I lost the original!

"This particular F6F-3 Hellcat served with VF-37, flown by a Lt Jim Ritchie, who scored three 'kills'..."

shiny oleo sections were painted Humbrol Metalcote Polished Aluminium and buffed up with a cotton bud. It fits into extremely secure locations in the wing.

Painting is simple, only one major colour being involved, although it must be said that white is never the easiest to apply, (especially if one chooses to brush paint), which in this instance I didn't! After masking the side transparencies with Tamiya

aerosol Appliance Gloss White. The anti-glare panel forward of the cockpit was masked off and painted matt black. The wheel wells were brush painted with Humbrol 56 Aluminium. The propeller front face was sprayed with Humbrol Metalcote Polished Aluminium and buffed to a high gloss. The rear face is matt black. The propeller tips are red.

Applying DRAWdecals requires a slightly dif-



Spitfire FR Mk 18, TP391 'N' of No 208 Squadron, based at Fayed, in Egypt, in 1948.

TP391 is shown as it would have looked sporting the revised Day Fighter Scheme but with the upper surfaces overpainted in the new post-war desert colours of Light Slate Grey and Dark Earth. The Medium Sea Grey under surfaces would have been retained



Spitfire Patterns and Colours

Vasko Barbic looks at some non-standard Spitfire schemes

The question of official standard colouring and patterns has been meticulously researched and clearly expounded in many publications over the years. The scope of this particular article is to deal instead with some seldom mentioned variations of the official schemes and, more specifically, with those that were applied to Spitfires.

The Spitfire entered World War Two sporting the Temperate Land Scheme as a defensive camouflage meant to conceal the aircraft on the ground, or when viewed from above whilst flying at low altitude. As most readers will already know, it consisted of Dark Earth and Dark Green upper surfaces in large alternating wavy swatches, the purpose of which was to break-up the aircraft's contours.

These two colours were applied in one of two disruptive patterns that remained standard throughout the whole of World War Two (and beyond) – the A Scheme, and its mirror image, the B Scheme. After several tentative combina-

tions of colours for the under surfaces, the Air Ministry finally settled for Sky, a sort of pale greenish beige which lasted into the summer of 1941.

During the summer of 1941, the Day Fighter Scheme, a new offensive scheme, was introduced for aircraft operating at over 10,000 feet and over the Channel. It was still applied in the

Scheme, with a light tan colour called Middle Stone (or Midstone) initially in place of the Dark Earth areas which was quickly altered to become a substitute for the Dark Green instead, creating Dark Earth and Middle Stone disruptive upper surfaces. The Sky under surfaces, having been found to be too pale and bright for the skies of North Africa, Southern

"Spitfires finished in the Temperate Land scheme, were deployed in Italy, France, Burma and India..."

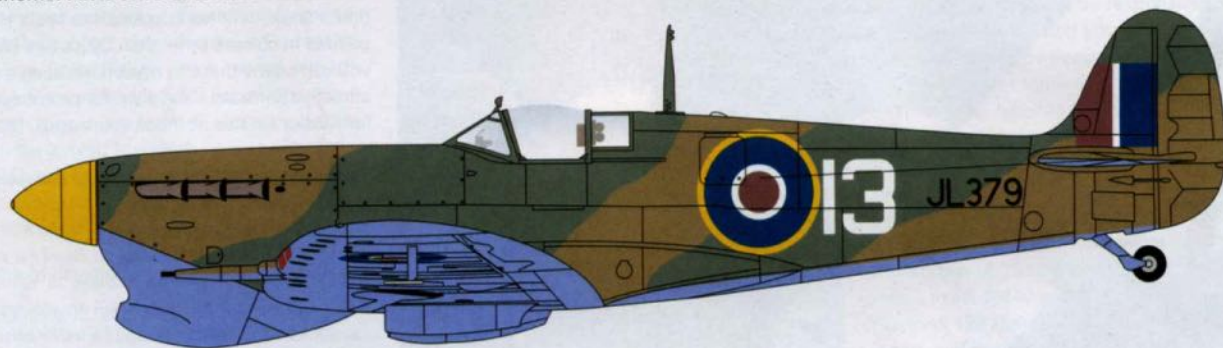
standard A and B Scheme patterns, but the Dark Earth was replaced with a mixed dark grey shade, which after a few months evolved in to a standard colour called Ocean Grey, and the under surfaces were finished in Medium Sea Grey.

In the meantime, the war in North Africa, and subsequently in other Mediterranean regions, prompted the introduction of a Desert Scheme. It was similar to the Temperate Land

Italy and the Middle East, was in turn replaced with the more appropriate Azure Blue, Light Mediterranean Blue and Dark Mediterranean Blue shades.

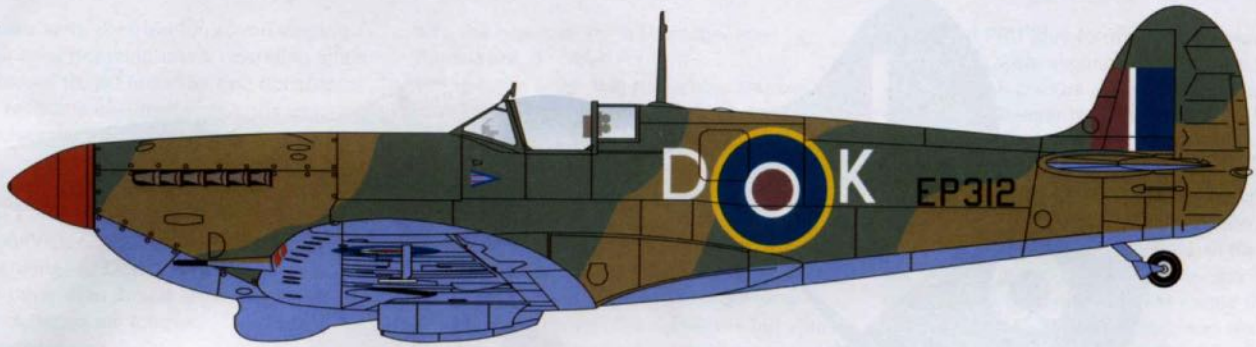
Variations on the theme

By mid-1943, with the war shifting to Tunisia and then to the Italian Peninsula, many Spitfire



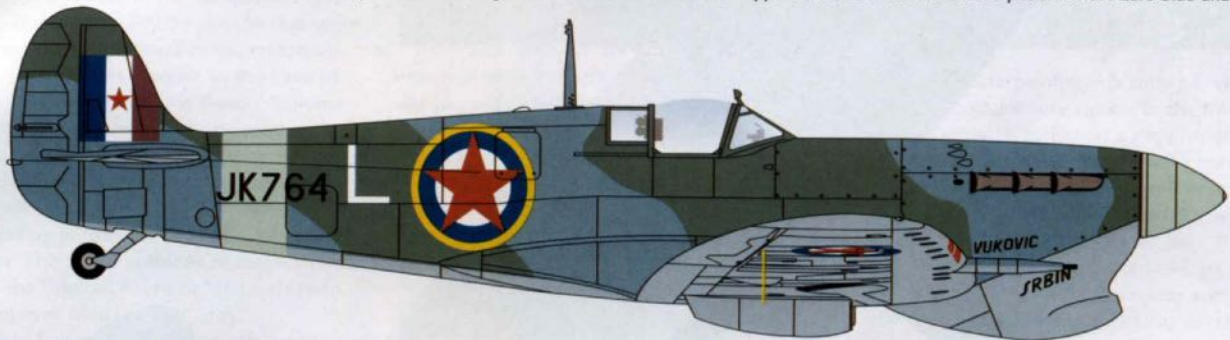
Spitfire Mk Vc, JL379, white 13, serving at Ismailia with 73 Operational Training Unit, in the Suez Canal Zone, Egypt, 1944

JL379 was a tropicalised Mk Vc and although used primarily for training, such aircraft were also allocated to the defence of the Suez Canal if required. It had the 'traditional' training unit yellow spinner and sported the revived Temperate Land Scheme of Dark Earth/Dark Green upper surfaces, in the standard A pattern. The under surfaces were Azure Blue



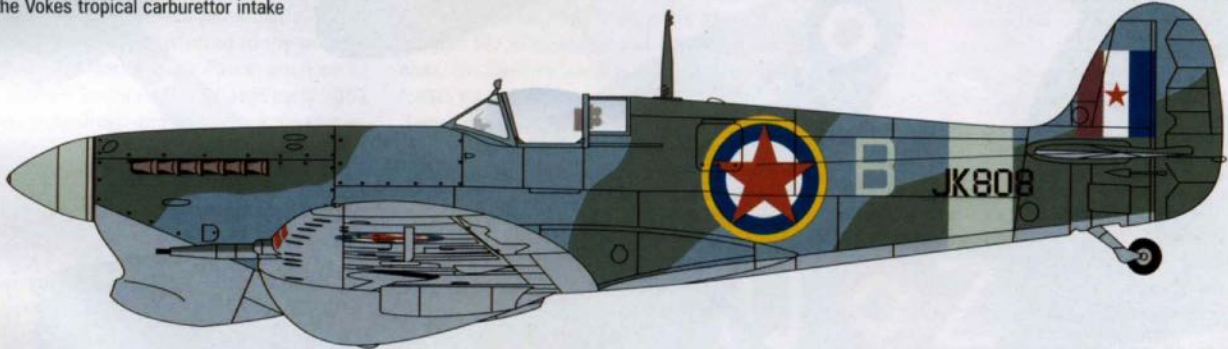
Spitfire Mk Vb, EP312, D-K, the personal mount of Wing Commander Dereck Kain, at Edku airstrip, Egypt, 1944

EP312 was the highly polished personal mount of Wing Commander Dereck Kain. It was photographed at the Edku airstrip, in Egypt, in 1944. It was specially modified for fast interception and upgraded with six-manifold exhaust stubs and elevators with enlarged horn balances similar to late production Spitfire Mk IXs. The camouflage was the standard Temperate Land Scheme of the late-war period, consisting of Dark Earth and Dark Green upper surfaces in the A Scheme pattern with Azure Blue undersides.



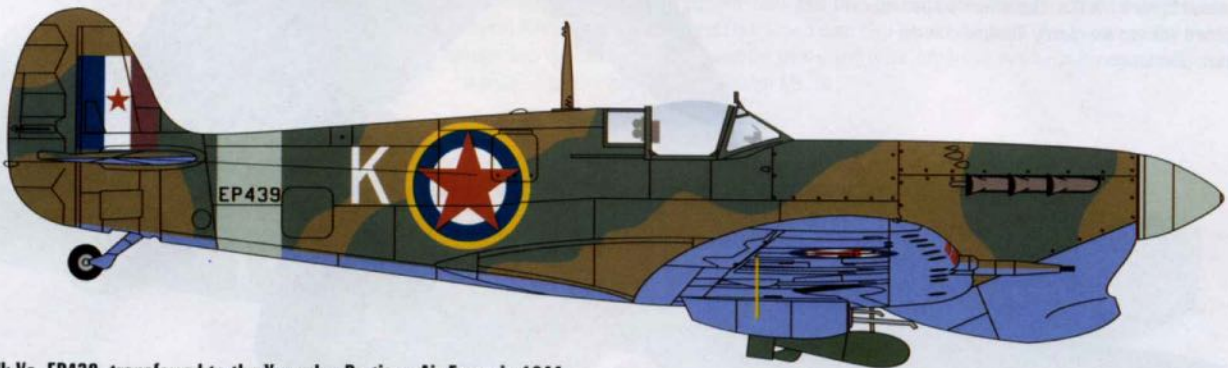
Spitfire Mk Vc, JK764, 'L' of the Yugoslav Partisan Air Force, based on the Adriatic island of Vis, 1944

This tropicalised Spitfire Mk Vc provides a good example of the variations encountered in the Day Fighter Scheme. The colours are the standard Dark Green and Ocean Grey upper surfaces in the B Scheme pattern, with Medium Sea Grey under surfaces. Like most upgraded Mk Vs, it is fitted with the new blade IFF aerial under the starboard wing and a semi spherical rearview mirror. Note that this aircraft was devoid of the usual outboard cannon stub. 'Vukovic' was the name of the pilot, a Serb, applied to the sides of the Vokes tropical carburettor intake.



Spitfire Mk Vc, JK808, 'B' of No 352 (Yugoslav) Squadron, RAF, 212 Group, Balkan Air Force, Prkos, Dalmatia, late 1944

JK808 was a tropicalised Mk Vc operating from Prkos airstrip in Dalmatia as part of 212 Group, Balkan Air Force towards the end of the war. It sported the Day Fighter Scheme applied in the so called D Scheme pattern, a variant of the A Scheme pattern, with the Ocean Grey and Dark Green colours transposed. The undersides were Medium Sea Grey. These Yugoslav Spitfires never wore squadron code letters but all the other markings were to RAF standards. Note that this aircraft was fitted with the six-manifold exhaust stubs, the later type enlarged horn balance elevator and the blade-type IFF aerial mast under the starboard wing. It has since been carefully restored to high standards and finished with a very accurately reproduced camouflage scheme and can be viewed at the Aeronautical Museum in Belgrade, Serbia.



Spitfire Mk Vc, EP439, transferred to the Yugoslav Partisan Air Force in 1944

EP439 was also one of the Spitfire Mk Vcs transferred to the Yugoslav Partisan Air Force in 1944. In contrast to the other two Mk Vs depicted above, this Mk Vc is painted in the prescribed late-war version of the Temperate Land Scheme. In this instance, the Dark Green and Dark Earth have been applied in the A Scheme pattern, with no transposition of the two colours. The Azure Blue from the earlier Desert Scheme was retained on its undersides. Being an upgraded aircraft, it featured the blade-type IFF aerial under the starboard wing. Note that this aircraft was fitted with a central rack for a 500lb bomb, rather than the underwing type more common on Yugoslav Spitfires.



Spitfire FR Mk 18, TZ233 'T' of No 208 Squadron, based at Fayed, in Egypt, in 1948.

TZ233 'T' is another of the often publicised Spitfire FR.18s of 208 Squadron, allegedly photographed whilst serving at Fayed, in Egypt, in 1948. Like TP391, on the heading page, it is depicted in the post-war desert scheme, devised to distinguish RAF aircraft from Israeli-operated Spitfire Mk IXs. The simplified pattern and transposed colours are clearly illustrated in the upper surface plan view.

squadrons were diverted to ground strafing and low-level bombing tasks, operating at altitudes below 10,000 feet. The first noticeable colour revisions occurred to the official camouflage schemes for aircraft operating abroad at this time.

According to the colouring diagram in Chapter I of Air Ministry Order A.864/44 (S.59966/IV/Ops.(A.D.)6-7.9.44), on the camouflage schemes of Day Bombers operating overseas in other than desert areas, they were to be camouflaged as follows:

- (i) Upper Surfaces
 - a) Unshaded areas – Dark Green
 - b) Shaded areas – Dark Earth
- (ii) Under Surfaces – Azure Blue

This was a variant of the Temperate Land Scheme and the Day Fighter aircraft that were to be used in ground attack roles, ended up being finished in that manner. In the case of Spitfires already wearing the Desert Scheme, the Midstone was simply over painted with Dark Green. Those aircraft delivered in the Day Fighter Scheme, the Ocean Grey was over-painted with Dark Earth; the Dark Green swathe falling across the cockpit area in both instances. The under surfaces of these aircraft retained the original Azure or Mediterranean Blue shades or Medium Sea Grey.

Spitfires finished in this 'late-war' version of the Temperate Land scheme were deployed in Italy, the South of France and with South East Asia Command in Burma and India etc. However, it seems there were some exceptions and anomalies, such as the ones particularly noticeable on aircraft transferred to the newly-formed Yugoslav Partisan Air Force, such as the tropicalised Spitfire Mk Vs flown by No 352 (Yugoslav) Squadron, operating from Canne in

Italy, the island of Vis in Dalmatia, (ex-Yugoslavia), or Prkos.

However, according to Serbian sources, it seems that in reality most retained their Day Fighter Scheme. Furthermore, photos taken at the time reveal that many other anomalies occurred, such as aircraft with the two upper surface colours of the A Scheme pattern transposed. Quite a few featured the B Scheme pattern, with a significant number of these sporting what might be termed 'the D Scheme pattern' – a variant of the B Scheme but with the Dark Green and Ocean Grey colours transposed. A good example of such a camouflage anomaly can be seen on JK808, a beautifully

faces, and PRU Blue for the under surfaces. These hues were slightly different from the standard RAF colours and were comparable to US Federal Standards FS 24064, FS 26152, and FS 25189 respectively.

However, in his publications, Paul Lucas asserts that a little known desert camouflage scheme was officially introduced by the Air Ministry around 1948 and applied, in the Eastern Mediterranean and the Middle-East, to aircraft such as the Spitfire. It was meant to distinguish the RAF fighter aircraft from the newly-born Israeli Air Force's Spitfire Mk IXes acquired from Czechoslovakia and Italy, (and RAF dumps).

"In the mid-1950s, Belgian Mk XIVs were finished in the new NATO Dark Green and Dark Sea Grey..."

restored tropicalised Mk Vc preserved at the Air Museum in Belgrade, Serbia.

The reason for this alleged choice of colours and their transpositions may lay in the topography of Dalmatia and its islands, where the prevalent hues are the pale grey of the rocky soil and the green of the Mediterranean-type vegetation.

A second revision of the existing Day Fighter Scheme was introduced towards 1944. It was applied in parallel to the standard scheme and consisted of a simplified version of the standard pattern, with transposed upper surface colours and less wavy Dark Green areas. This scheme was very evident on some post-World War Two RAF Spitfire Mk XVIIIs and on Belgian Mk XIVs of the mid-1950s. In the latter case, the colours were superseded by the new NATO paints, which consisted of NATO Dark Green and Dark Sea Grey on the upper sur-

These were painted in a scheme with pattern and colours very similar to the RAF Day Fighter scheme, including a red propeller spinner, initially introduced by the RAF during the Second World War, as a recognition colour for its fighters operating in North Africa and the Middle East.

The new scheme consisted of Dark Earth and Light Slate Grey for the upper surfaces, combined with Medium Sea Grey on the under sides. It was apparently applied to, amongst others, aircraft of No 208 Squadron based in 1948 at Fayid in Egypt. **MAN**



Spitfire Mk XIVe, SG127 IQ-Z of the Coxyde Fighter School, Royal Belgian Air Force, Belgium, circa 1956
SG127 was an unarmed late production Spitfire Mk XIVe of the Royal Belgian Air Force, repainted in the revised Day Fighter Scheme with simplified pattern. Note that the upper surface colours are transposed and are in the newly adopted NATO Dark Sea Grey and Dark Green with PRU Blue undersides. The yellow on the front of the spinner was the colour generally adopted by training units. Note that this aircraft was retrofitted with the broader and taller rudder of the Spitfire Mk 18



Spitfire Mk XIVe, SG104 IQ-N of the Coxyde Fighter School, Royal Belgian Air Force, Belgium, circa 1956

SG104 is another late production Royal Belgian AF Spitfire Mk XIVe and, like SG127 above, is another good example of the revised Day Fighter Scheme and newly adopted NATO Dark Sea Grey, Dark Green and PRU Blue colours. It too belonged to the Coxyde Fighter School, hence the yellow on the spinner.

Armchair Pilots

And now for something completely different, Andy Evans answers some frequently asked questions about Flight Simulation on your PC



Flying on your home computer using flight simulation (FS) software is very rewarding, great fun and can substantially improve your understanding of real-world aviation. Not that long ago, flight simulation on PCs was extremely basic, with rudimentary aircraft models, a one-colour ground surface, no varying weather conditions to deal with and only a small area in which to fly.

Since then virtual aviation has come on in leaps and bounds, and with the improved processing power offered by today's affordable home computers, flying on your PC is now both realistic and inexpensive.

What exactly can I fly in a PC flight simulator?

The short answer is... almost anything that can be (or has been!) flown in real-world aviation. You can hop a memorable hundred yards in the Wright Flyer, flash across the Atlantic in Concorde, or perhaps you'd prefer a sortie in a classic Spitfire or a mission in a modern RAF Hercules or F-16 Viper. It's possible to fly civil and military planes from every era of aviation, whether helicopters, jets, gliders or propeller-driven aircraft. One of the most appealing aspects of flight simulation is that there are absolutely no limits on what you can fly and where you can fly it.

Where can I fly?

The entire world is available for you to fly in, from Antarctica to Zanzibar and all points in between. It's up to you whether you take off from your local grass airstrip or one of the busiest international airports around the world. You can fly the very same routes that exist in the real world, or visit countries and places you'd never normally have the opportunity to visit.



Loose off a couple of Sidewinders in an F-16

Do I need to be a computer expert to enjoy PC flight simulation?

No – although basic familiarity with the day-to-day functioning of a modern PC will obviously be necessary. Flight simulation software and hardware are designed to install and work with a minimum of fuss, and FS enthusiasts range from those still at school to virtual pilots who are long past retirement age and are using computers specifically to enjoy simulated flying.

What equipment do I need to get started in flight simulation?

Getting airborne is simple and requires a minimum of equipment (hardware) and flight simulation programs (software). Hardware – You'll need a



Get behind the controls of a Lancaster

reasonably powerful PC, but nothing that you can't easily find in the showrooms of your local PC retailer. We'd suggest, as a minimum, that you have a PC running the Windows XP operating system, a processor with a speed of 2GHz or faster, 512Mb of RAM, a graphics card with 64Mb of RAM, 20Gb of hard drive space, mouse, sound



F-117



Fly a Stealth

card and speakers and/or headphones.

Because of the increasing size of the software, many flight sim products are now produced on DVD-ROM, rather than CD-ROM, so a PC with a DVD-ROM drive is recommended. Generally speaking, the better specified the PC, the better the graphics and fluidity of your FS experience.

I'd also recommend a joystick or yoke to control your aircraft. Most FS flyers start with a joystick (which includes a throttle, rudder controls and various button assignments) and this is perfectly adequate for enjoyable flying. We'd recommend buying a joystick with a 'hat switch' (a thumb-operated multi-position control at the top of the stick) – this will prove invaluable for scanning the cockpit and views in all directions. Buying a yoke and rudder pedals is generally the next step, although certainly not essential, and will replicate even better the sensation of flying a real aircraft.

Software – There are a number of PC flight simulation programs around but by far the best in terms of performance, value and popularity is



Vulcan



Thrustmaster
Joystick and Throttle
combination

Microsoft's Flight Simulator series, which has been around for over 20 years.

What exactly are a 'standalone' program, 'add-ons' and 'freeware'?

A standalone program (such as Microsoft's Flight Simulator) is one that doesn't need any further software for it to work. You can buy it, install it on your PC and use it. With a copy of Flight Simulator you certainly won't be stuck for aircraft to fly or places to go, but there is much more that you can add to improve your FS world. Add-ons (or expansions, as they are sometimes known) are extra programs designed to expand the Flight Simulator program in specific ways or adding extra details (i.e. detailed airports, specialised cockpit avionic systems, improvements to the terrain and so on).

As the name suggests, add-ons need a standalone sim with which to work (i.e. a 'host' sim) and Microsoft brings out a new version of Flight Simulator every few years and some add-ons only work in one particular version of a host sim; some may

areas around the world, with buildings, landmarks, roads, rivers and railways and more.

- Utilities – this covers a huge range of additional features, such as flight planners, additional cockpit instrumentation, accurate ATC, weather upgrades to recreate exactly the conditions a real-world pilot might face, extra airport traffic so that the aircraft you see at an airport is just as it would be in real life.

Do I need to be an expert in aviation to enjoy flight simulation?

Not at all! While actual flying is unfortunately beyond the financial means of many of us, we can still enjoy the next best thing. Flight Simulator allows you to find your own level and area of interest and take it casually or seriously as you like. (Flight Simulator, incidentally, provides an excellent training programme on which to build.)



Saitek X-52
control centre



A young flyer tries his hand at piloting an RAF Tornado at the SAM stand during the IPMS Scale Modelworld 2006

the trappings of the airline pilot's career. Others fly online combat missions together in Virtual Squadrons and there are numerous flying clubs which will welcome you as a member; chances are that you'll find one which caters for the type of flying you want to do.

Finally... just how realistic are today's flight simulators?

No one has ever claimed that simulated flying can take the place of real-world flight training but, given the constraints of a home PC set-up, today's sims are impressively realistic. A real-world pilot can now practise a simulated flight he's planning to make in the real world using accurate representations of departure and destination airports, flying over scenery that is developed from actual photographs of what's on the ground, navigating with navigation aids in their real-world positions, and flying in real-time weather conditions which are applicable to the flight route. Indeed, many pilots do just this.

The realism of today's sims is such that the General Aviation press now regularly features simulations in its pages and the number of pilots involved in developing FS software shows that flight simulation is far beyond what you might call a 'game'. Happy landings! **MAM**

"...virtual aviation has come on in leaps and bounds, and is now both realistic and inexpensive..."

work in several, so always check the specifications on the box before buying.

The purpose of add-ons is to allow the virtual flyer to customise certain aspects of the default FS world to suit exactly the type of flying he or she wants to do.

Freeware refers to add-ons which are created by enthusiasts for others to share and are totally free! If you've got an Internet connection you can download thousands of new aircraft, airports and a multitude of other programs, many of which are of the very highest quality. There are hundreds of websites with enormous libraries of freeware, from which you can download and enjoy as much as you like, perfectly legally!

Software developers are constantly working hard to make the simulated experience as close as possible to real aviation, and progress in many areas is truly impressive. Here are just a few types of add-ons you can buy – or find for absolutely nothing in freeware libraries:

- Aircraft – if you look hard enough, you can probably find a simulated model of every aircraft that has ever graced the skies.
- Repaints – Airline liveries and squadron markings.
- Airports – highly detailed versions of specific airports across the globe
- Scenery – highly detailed versions of certain



Thrustmaster Joystick

Some of us enjoy leisurely flights and short hops in light aircraft or historical planes, while others devote countless hours to mastering the complex cockpit systems of modern jet airliners or jet fighters; it's entirely up to you!

Is flight simulation just a solitary activity?

Far from it – with an Internet connection it can be a very sociable activity. Some pilots fly with Virtual Airlines, some of which are based on the aircraft and schedules of real-world airlines, which involves flying specific routes in designated aircraft, with reports, promotions and all



757 Professional



C-130 Hercules



RAF Tornado

Just Flight

For more information visit www.justflight.com or write to
Just Flight Ltd
2 Stonehill
Stukeley Meadows
Huntingdon
PE29 6ED

Showtime

Monthly update on aviation and related events near and far...

diary

March

Saturday 1 March, 2008

East Anglia Model Show

organised by the Greater Peterborough Model Club. To be held in the Town Hall, Peterborough. Contact the secretary Ken Almen on 01733 321617 or by email on greaterpeterboroughmodelclub@msn.com

Saturday 15 and Sunday 16 March, 2008

Southern Expo Model Show 2008 IS BACK!

at the Hornchurch Sports Centre, Harrow Lodge Park, Hornchurch Road, Hornchurch, Essex RM11 1ET. 35+ club stands; 35+ trade stands; Open Competition (Sunday only). Entry: Adults £3.00, Children/Concessions £1.00. For further details contact: Peter bagshaw Tel 01708 762102 or Robin Bellamy Tel 01708 376508 or e-mail southernexpo@tiscali.co.uk

Saturday 15 March, 2008

IPMS North Somerset/North Somerset Modellers Society

present the 13th Annual North Somerset Model Show, at Locking Castle Campus, Weston-super-Mare, BS24 7DX. 10.00am to 5.00pm. Admission £2.00 adults; £1.50 concessions; £1.00 children. Contact Dave Perry tel 01761 462864 or Darren Poyser tel 01934 516756 or go to www.finetooth-systems.com/IPMSNorthSomerset

Saturday 29 March, 2008

Replikon XXIII (now in its 23rd year)

organised by the Long Island Scale Model Society, Long Island, New York. To be held at the Freeport Recreation Center, Freeport New York, USA, from 9.00am until 4.00pm.

The contest will contain forty three categories, plus best LI subject and best 'Desert Storm' subject. Also there will be 'Best Of's' for aircraft, armour,

ships, automotive, figures, sci-fi, and a 'Tailhook' award for the best naval aviation subject.

Contacts: LISMS Website: longislandscalemodel.tripod.com

Updates for the show will be posted as they happen so please check back often!

Show Information: Mr Howard Belkin at: hab69@aol.com

Vendor Information: Mr Robert Demaiot at: taurleo@optonline.net

Southern Expo 2008
Model Show
March 15th and 16th 2008
10am to 5pm both days

Hornchurch Sports Centre, Harrow Lodge Park, Hornchurch Road, Hornchurch, Essex, RM11 1ET

Entry: Adults £3.00, Children & Senior Citizens £1

For further details send SAE to either:

Peter Bagshaw, 25 Reson Drive, Gidea Park, Essex, RM2 5LP Tel: 01708 726 102	Robin Bellamy, 100 Farrington Avenue, Harrow Hill, Essex, RM2 5LT Tel: 01708 376508	Nearest Underground Station (Hornchurch Station Line) Nearest Mainline Station (Hornchurch or Upminster) Bus Stop: 153, 385 or 248, 370 Any Car: 4 miles from M25 Junction 24 or 25 Free Parking
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Email us at southernexpo@tiscali.co.uk
Or visit the website for more information
<http://myweb.tiscali.co.uk/southernexpo>

THE SCOTTISH NATIONAL SCALE MODEL SHOW 2008

THE DEWAR'S CENTRE
GLOVER STREET PERTH
OPEN 10AM TO 5PM
Saturday 26th April and Sunday 27th April 2008
MODEL COMPETITIONS, CLUB DISPLAYS, TRADERS,
DEMONSTRATIONS, TOMBOLA
CONTACT JIM GIBB on 01738441365 for further details

www.scotnats.org.uk

WE'RE BACK !!

Shropshire Scale Modellers

in association with



AND ROYAL AIR FORCE **museum** COSFORD

Present

The Shropshire Model Show

SUNDAY 6th APRIL 2008

10 am to 4 pm

Trade
Stands

Refreshments

Free Admission
& Parking

Open
Competition

Club
Displays

Tombola



For more details contact:-
The Royal Air Force
Museum Cosford,
Cosford, Shifnal, Shropshire TF11 8LP
Tel: 01902 376200

April

Saturday 5 April 2008

MOSQUITOCON 2008 Model Show

New Jersey IPMS Chapter's annual event takes place at the Wayne Police Athletic Hall, PAL Drive, New Jersey, USA

Special Theme: 'Prelude to Victory'. Show includes a model contest, tons of vendors and great hot food available at the show. Show & Vendor Contact: Dave Schwarz, 973-628-1377, email: racer3@optonline.net. Visit www.njipms.org for more info.

Sunday 6 April 2008

Shropshire Model Show

organised by IPMS Telford to be held at the RAF Museum, Cosford 10.00am to 4.00pm. Trade stands; Open Competition; Club displays. Free Admission and parking. For further details contact RAF Museum Cosford 01902 376200

Saturday 12/Sunday 13 April 2008

The Footman James South West Model Engineering, Model Making and Hobbies Exhibition

at The Royal Bath and West Showground, Shepton Mallet, Somerset. Trade stands, club stands, model displays. For further information, contact Nadine Lingard, Event Organiser, Tel: 0117 907 1000 email: user@nwe.co.uk

Saturday 19 April 2008

IPMS Dorset/Poole Vikings Annual 'Model Show'

at Parkstone Grammar School, Sopers Lane, Poole, Dorset. BH17 7EA. Commencing 10.00am until 4.30 pm. Entrance fees: £2.00 for Adults, £1.00 for Senior Citizens and Children, Family Ticket, (2 Adults & 2 or more children), £4.00.

There will be various trade and club stands, together with competitions and a raffle. Refreshments will be available all day and Car parking is Free. For further details contact Jez Thomson on (01963) 32385 or email: poole.vikings@virgin.net





northern scale model show

TRADERS • COMPETITIONS • DISPLAYS

SUNDAY 1st JUNE 2008

Temple Park Leisure Centre, South Shields NE34
(just off the A1300 John Reid Road)

Show open 10am until 4pm Organised by I.P.M.S., Tyne-side
Enquiries to Graham Tel no. 0787 6441701

Saturday 26 and Sunday 27 April 2008

The Scottish Nationals Scale Model Show 2008

held at the Dewars Centre, Glover Street, Perth. Internationally recognised model competition; trade stands; club stands and displays; modelling demonstrations; tombola. 10.00am to 5.00pm For further details contact Jim Gibb tel 01738 441365 or email www.scotsnats.org.uk

Sunday 27 April 2008

Military Book Fair and Reserve Collection Open Day

Aircraft enthusiasts will have a day to remember on Sunday 27 April when the Fleet Air Arm Museum combines the first of the 2008 Reserve Collection Open Days with their Military Book Fair. The Museum's Reserve Collection is housed close to the Museum in Cobham Hall. There are over forty historic aircraft, including one of the largest collections of Westland Helicopters, the first swept wing aircraft to land on a carrier, the Gazelle helicopter on which HRH The Duke of York learnt to fly, a bullet ridden Argentinian Beechcraft Mentor and even a prototype Bouncing Bomb!

There are some five miles of shelving containing over 30,000 records and artefacts. If you haven't



seen the Museum's extensive reserve collection, don't miss this rare opportunity.

The Reserve Collection and the Military Book Fair will be open from 10.00am - 4.00pm

In addition to the Military Book Fair and Reserve Collection Open Day, visitors to the Museum will have the opportunity of seeing Europe's largest collection of naval aircraft as well as going on board the first British built Concorde.

May

Saturday 10 May, 2008

IPMS (UK) Annual General Meeting

at the AeroVenture Air Museum, Doncaster. Production of current IPMS(UK) Membership Card enables FREE entry to the museum.

Saturday 31 May, 2008

IPMS Salisbury Annual Model Show and Competition

between 09.30 and 17.00 at Wyvern College, Church Road, Laverstock, Salisbury, SP1 1RE, UK. Over 45 Clubs, SIGs and Traders, plus a raffle and refreshments together with free on site parking. Further details from the Branch Secretary, Peter James, 01980 862403, email Peter@toggie.freemove.co.uk or Richard Lane on 0781 55 79 565, or visit us at www.IPMS-Salisbury.org.

June

Sunday 1 June, 2008

Northern Scale Model Show

organised by IPMS Tyne-side. To be held in the Temple park Leisure Centre, South Shields, NE 34, just off the A1300 John Reid Road. 10.00am to 4.00pm. Trade stands; Club stands; Annual Model Competition, and FREE parking! Contact Graham on 0787 6441701



2008

Friday 6 June, 2008

3rd East Anglian Model Competition

IPMS Ipswich are pleased to announce that SBX Model Shop will be sponsoring the 3rd East Anglian Model Competition at the Ransomes Sports and Social Club, Sidegate Avenue, IPSWICH, IP4 4JJ. Entry fee - 50p per model. Non-competition admission £1.00 (concessions 50p). Bar and USAF(E) B-B-Q. 19:00 to closing time. (Big screen TV available in case of FA interference - again!) Entries close 20:00. Pre-register to avoid delay. Contact: Kev Baxter (01473) 832163, www.ipms-ipswich.org.uk

Saturday 28 and Sunday 29 June, 2008

Model Expo 2008 and the Australian Open Plastic and Scale Modelling Championships

to be held at the Entertainment Centre, Sandown Racecourse, Princes Highway, Springvale, Melbourne, Victoria.

For details see www.modelexpo.com.au, email expoinfo@modelexpo.com.au, or telephone Ian Vale (03) 9873 4256.

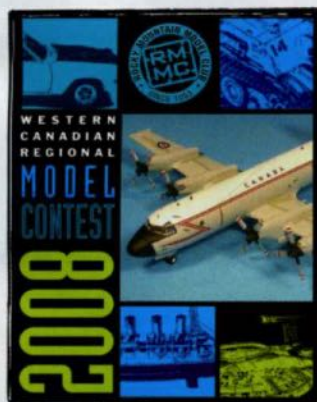
August

Sunday 24 August 2008

Sywell Airshow returns for 2008

Sywell Aerodrome will again host its very popular biannual airshow on Sunday 24 August 2008 promising the usual mix of classic aircraft and family attractions ensuring a superb day out all in aid of the Warwickshire and Northamptonshire Air Ambulance.

For more information keep an eye on www.sywellairshow.co.uk for updates, acts, ticket details, trader applications and the latest news building up to the day itself!



Saturday May 17, 2008 Sandstone Valley Eucemical Centre
1100 Berkshire Blvd NW, Calgary AB, Canada

Hundreds of models on display, wider variety of categories, great Prizes and Special Awards. Entries accepted between 9:00am and 12:00pm. Contest area open all day for viewing. Award presentations at approximately 4:30pm. Sweepstake and display areas open all day. For more information please Scott at 403-214-3711 or visit our website.

www.rockymountainmodelclub.com

Forum

Saharan Sunset saga... 1

Dear Neil,

With reference to the 'Saharan Sunset' article in the January 2008 (Vol 7/1) issue, the following notes may be of interest to your readers...

The Spanish Sahara cannot be South West Africa, as it is in the northwest of the continent. South West Africa was the old colonial name for present day Namibia.

The basic unit in the Spanish Foreign Legion is the 'Bandera', (not the Battalion). In UK terms a Bandera is about the equivalent of an under-strength battalion, about the size of an RM Commando.

Some of the local troops involved would have been para-military police and others Regulares – Muslim North Africans, commanded by Spanish officers.

Your Kiwi readers might be a bit miffed by Glenn's, "I bet you never thought that the old girl had ever been seen in a war zone"; the RNZAF flew Bristol Freighters in combat in various 'unpleasantnesses' such as in Southeast Asia in the 1960s and the early 1970s. I think the Pakistanis used them 'in combat' too. (The RAAF examples never left Australia).

The AISA I-115 was a tandem-seat trainer, about 200 being built in 1952-56, most serving with the Academia General del Aire and 792 Escuadron, although some were employed as 'hacks' by operational units and air bases. My guess, for use in the Sahara, they would be used in the liaison plus artillery spotting role, during the siege perhaps. In the mid-1960s the remaining airframes were sold to civilian aeroclubs. (A conversion from a Chipmunk looks possible...).

My Spanish references give the HA-1.112 Buchon (Pigeon) a span of 9.9m and a length of 9.0m, with a wing area of 16m², some 450mm longer in the fuselage and 130mm greater in wingspan than the Bf 109E.

The 1957 campaign may be forgotten but it was never a secret, the numbers of troops involved precluded that. In any event, Franco may not have been the most loved of leaders, but he was never shy about publicising 'his' military campaigns. Spain in the 1950s and 60s was a much more militarised society than today. Even today, away from the tourist traps, one sees far more troops than say in the UK, even ignoring police and the Guardia Civil.

Not surprisingly, the best references on Spanish military equipment

and campaigns come from Spanish publishers, Alcaniz Fresno SA having a very comprehensive range of books on topics from the 1920-25 Riff War to recent operations in Iraq.

Two excellent references on Spanish operations in the Sahara are: Historia Militar Cuadernos No 1 'Aire, Agua y Fuego' and No 4 'Sahara, 1975' both from Alcaniz Fresno SA, which cover operations in Spanish Sahara in some detail, in Spanish of course. The better book shops and mail order houses may be able to get them for interested readers.

Details of Spanish military history are well covered by several Spanish publishers, with Alcaniz Fresno SA

having an excellent monthly military history magazine 'Historia Militar', the annual subs are about 42 euros.

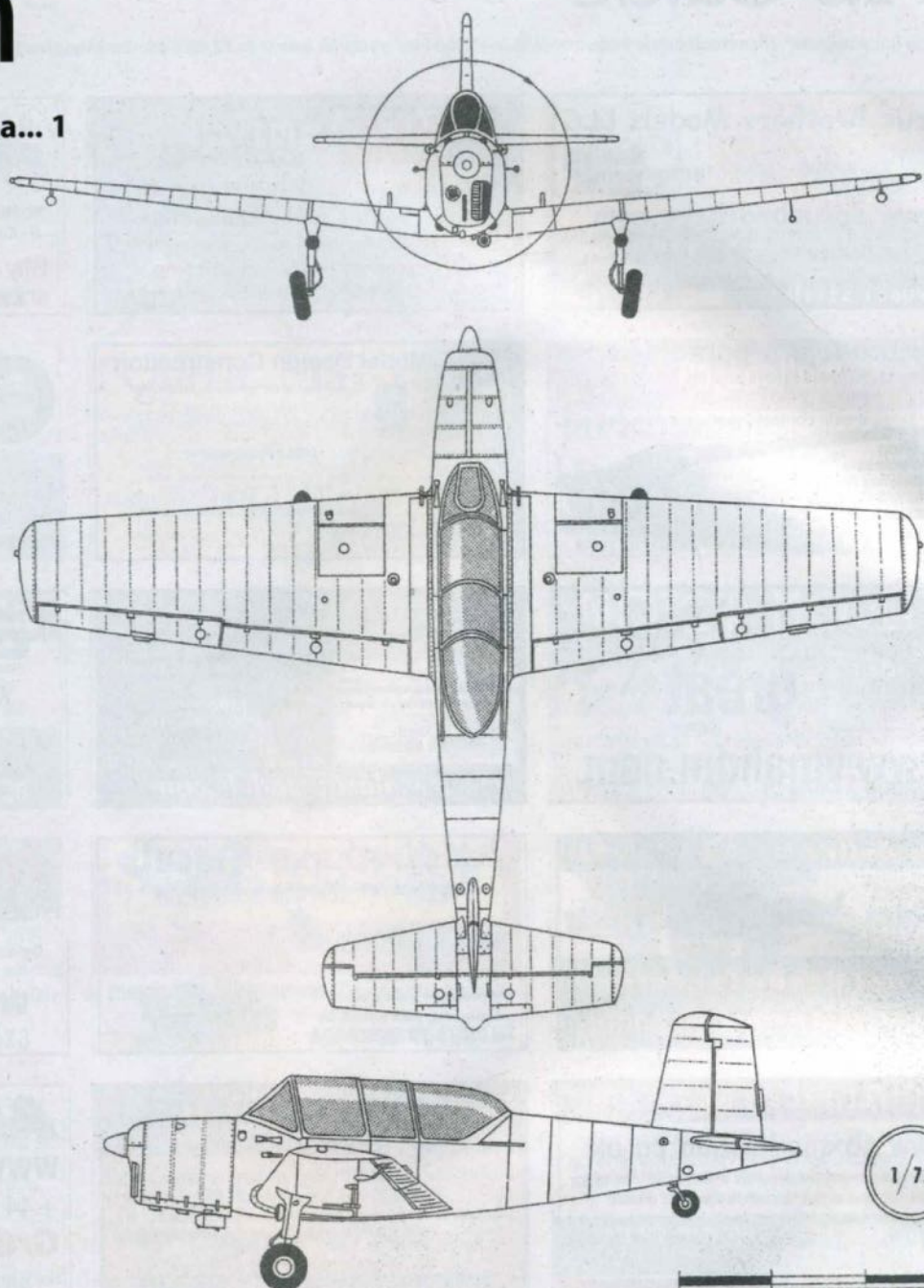
There is also a part-work, 'Enciclopedia de la Aviacion Militar Espanola', listing alphabetically Spanish military aircraft in great detail. No 114 covers the CASA 235, (I doubt I'll live long enough to see the one covering the Vultee V-11)

Libreria Gaudi SL in Madrid is a reputable bookshop with a vast range. I've had excellent service from all publishers and bookshops in Spain over more than 10 years - once they overcame the shock of a non-Spanish speaking modeller from Oz being interested in Spanish military history!

Incidentally, the NA Texans used in 1957 were basically T-6Ds supplied by the US with the same restrictions as the F-86s. To overcome this 'problem', Spain purchased about seventy T-6D/SNJ-4/5/6 airframes 'on the open market', overhauled and refurbished them in Spain to approximately T-6D standard and armed them with Breda 7.7mm machine guns and rockets. The rear seat instruments were removed and an extra fuel tank and radios installed.

I hope this is of use? Keep up the good work with 'MAM'...

Ley Reynolds
Australia



Saharan Sunset saga... 2

Dear Neil,

I read with great interest the article about the 'Saharan affair' in the January 2008 (Vol 7/1) issue, and the involvement of the Spanish military aviation. It is not very often you can read this kind of thing in magazines outside Spain. In his article, Glenn Wilson asked if somebody could give some details about several points, so I hope the following data can help.

The AISA I-115 was indeed a trainer/liaison aeroplane designed by Aeronautica Industrial S.A. It was known as the E-9 in the Ejército del Aire terminology. It was designed in 1948 and its first flight was in 1952, entering service in the EdA in 1956 – in theory to take over from the CASA 1131, (Bucker 131 manufactured in Spain), which it never really did.

Seemingly, the Cadets in the Academia General del Aire, (AGA, Spanish Air Force Academy), nicknamed it 'Garrapata', (Tick), allegedly because of its reluctance to leave the ground!

In more serious terms, the aeroplane was almost totally made of wood, which made it relatively heavy and the only available engine then in Spain, the ENMASA 'Tigre' G-IVb, with four inline cylinders only produced 150hp, which made it underpowered. It also had some problems as its CG was way forward and thus the aeroplane had a tendency to dive or engage itself in a spin. This said, it was considered a 'difficult' aeroplane for a novice, but nothing particularly demanding for an experienced pilot.



Technically speaking it was a single-engine, low-wing cantilever monoplane, made mainly of wood. Its crew was housed in a fully enclosed tandem cockpit with dual flight controls. It had a fixed main undercarriage with a tailwheel. It was powered by a single ENMASA 'Tigre' 150hp engine that drove a two bladed wood propeller, (fixed pitch of course).

The specs are as follows, (more or less): Length 7.35m, Wingspan 9.54m, Height 2.10m. Max speed 229km/h (123.5 kts), Cruise Speed 195km/h (105 kts), Stall Speed 81km/h (44 kts), Endurance 3.5 Hours, Ceiling 4300m (14000 ft).

As for the airlines in Spain, there were only two of them – Aviación y Comercio and Aviaco being one and the same, and Iberia. Aviaco was created by the Spanish government when they thought that Iberia was not going to be able to cope with all the internal demand. In the end, Aviaco was absorbed by Iberia and

ceased operations in 1998.

The normal colours for the airlines in Spain at the time were easy – as a rule of thumb you can say overall metal with white tops and sides of the fuselage, fin and rudder. The coloured titles and cheatline were red for Iberia and dark blue for Aviaco. Often, but not always, there was also a band with the Spanish Flag colours across the top of the in and rudder in the Aviaco machines. Registration and serials were in black.

The HA-1.112 Buchones engaged in the 'Moroccan Fracas' were painted blue overall, although the paint was seemingly an automotive paint – of Peugeot origin! I'm still trying to track down the correct reference and FS number if possible. However, one of the data that gets usually lost is that one of the major feats of Spanish military aviation history is hidden

inside this history.

The Buchones had to be relocated to Ifni in Spanish Morocco in order to be used over the Sahara, so some drop tanks were custom made in Spain and the Buchones were flown by their pilots from Sevilla to Ifni in a non-stop flight with the help of a multi-engine aircraft, (I do not know which kind), for navigational purposes. The external tanks looked like cylinders with a cone shape on each end, but I do not have the exact measures for them.

Finally, after looking for Aviaco on the Internet, it seems that Glenn was quite correct and the Bristol 170 freighters were indeed Type 21s.

Last, but not least, if somebody is interested in modelling Spanish aviation I would recommend the decals from 'Pieza a pieza' and 'Series España', as they have quite a choice of Spanish marked machines.

If I find some more information I'll let you know. Looking forward to next month's issue of 'MAM'.

Jose A Arruga
via email



HobbyCraft MiG-17

Dear Neil,

First, let me say that I really enjoyed your work on 'QSM', and while it took me a while, it was a pleasure to discover 'MAM' with that same mix of history and modeling that I love – and so much more of it! I'm enjoying my subscription very much, and it does complement 'SAM' which I've subscribed to for many years. We just don't have anything to compare on 'this side of the pond'. Both magazines also give me my necessary monthly dose of 'European aircraft' as well as 'European point of view' – we Yanks didn't do it alone in spite of the opinions of some! Keep up the fine work!

As I devoured my freshly delivered January 2008, Volume 7 Issue 1, regarding the 'Bush War' article, I did want to let you know that the HobbyCraft 1/48 scale MiG-17 is actually their own tooling; I've got both types of kits, (HobbyCraft and SMER, as well as Airfix), in the stash. The HobbyCraft kit is simpler in

design but is known to fit well, and does look like a 'proper' MiG-17 when made.

The most recent HobbyCraft boxing, (1437), MiG-17F 'Flashpoint Fighter', includes some additional parts including ground attack stores and pylons and new high quality decals for at least five different countries. It is currently 'out-of-production' but can still be found at model meets and on the internet.

You were wise to be clear that you were guessing on this point, but as something of a kit archaeologist, (see my Hasegawa and other 1/48 Kit Tables in the Kit Research section of the Modeling Madness website), I wanted to share this information with you so you have the facts.

Tony Hodun
USA

What about the FAA?

Dear Neil,

Although I realise that the last Air Wars supplement was solely concerned with RAF operations, it did mention Army Air Corps operations too, but neglected to mention the Fleet Air Arm contribution to 'Operation Granby'!

Just to put the record straight, an entire squadron of Sea King HC.4 'Junglies' operated in the desert alongside RAF Pumas and Chinooks, and others were based on ships off-

shore along with a number of Lynx ship's helicopters...

Regarding the description of the camouflage scheme of the Army Air Corps helicopters, they were in fact in a two-tone pattern of Light Stone and Desert Pink with three white stripes on the boom if memory serves me correctly.

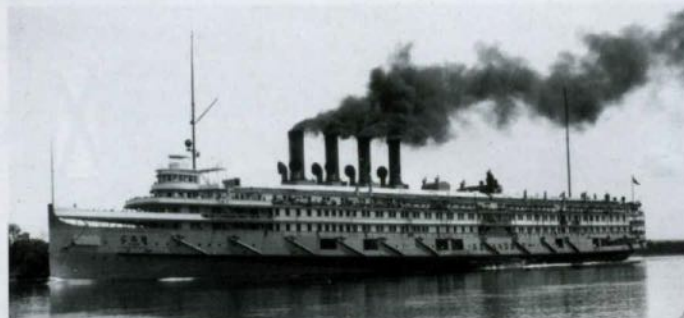
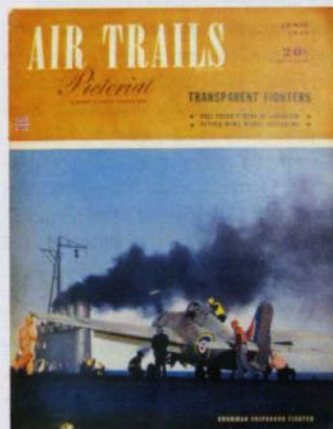
H Nelson
via email

Paddle blade aircraft carrier?

Dear Neil,

I recently obtained an issue of 'Air Trails', the old modeling magazine. This particular issue is from April 1943 and has on the cover a photograph of a Martlet aboard an aircraft carrier, or so it seems... (see the accompanying scan of the cover).

That island in the background probably does not look too familiar. The ship is the aircraft training ves-



SS Sealand (C&B)

sel USS Wolverine, IX-64, sailing out of Chicago, Illinois, on Lake Michigan.

The Navy established a Carrier Qualification Training Unit at NAS Glenview. Assigned to the CQTU was the USS Wolverine and the USS Sable, (IX-81). The USS Sable was not in service yet, so only the USS Wolverine was available for the eight landings and take-offs required to become carrier qualified. What is great about the USS Wolverine and Sable is they were

coal-burning sidewheelers, converted passenger vessels.

I have been researching these



USS Wolverine

two vessels for the last half dozen years and occasionally run across reference to British receiving some training here, but no detailed information, then this magazine cover surfaces. It would make a great 'Can you identify the ship' question.

If any of your readers ever you run across references to Brits flying off ships on the Great Lakes, would you ask them to let me know? By the same token I'll be happy to answer any questions they may have.

Doug Wilde
via email

What about the 20-somethings too!

Dear Neil,

I have just read your editorial in the February 2008 (Vol 7/2) issue of 'MAM' and am writing in regard to your comment that, "we may need to look to the 30-somethings as our only hope and salvation in keeping the hobby going in the future."

I might be the exception that proves your rule. Seven years ago I restarted building model kits, (aircraft, ships and tanks). I was still one of the 'just-glue-the-kit-together-and-slap-the-paint-on' modellers.

Six years ago I met my partner, Vicky, who at first knew nothing of my 'terrible' secret. At first she did not know if she liked me modelling or not, (as it took my attention away from her). However, she has come to understand that there are advantages to modelling – like most of the time she knows exactly where I am. She has even come to appreciate the skill involved in making model kits.

In July 2005 we bought our first house together. One of the criteria was that it would have to have somewhere for me to make (and display) my models – a spare bedroom and a shed to spray in. Since we bought the house I have become more of a 'serious modeller'; I have discovered the beauty of aftermarket sets and I have a few resin kits to build, (which I need to pluck up the courage to start on).

As Vicky is a big fan of the 'Red Arrows', last year I built the old Airfix 'Red Arrows' Hawk for her. For a

month during the build I kept it secret from her, including the trouble I had in scratchbuilding the diesel/dye pod normally fitted to 'Red Arrows' Hawks. Thankfully she was very impressed with the finished model and said it looked just like the real thing. This was one of approximately fifteen aircraft models that I made that year.

To bring this rather long-winded story up-to-date, I am looking forward to buying and building lots more models this year – including the Airfix Nimrod, which I am hoping to get to celebrate my 29th birthday, (I was 21 when I restarted modelling).

During the past seven years I have seen many new kits released, however against this, I have also seen many of the model shops and model departments in toyshops of both my youth and early adulthood disappear. I have also seen the rise of the internet model shop.

This does make it very difficult for the new and/or younger modeller to get started. It also doesn't help that some of the people I work with only regard flying models as 'real' modelling. We also have to compete in an era of the computer game, (which I am also a fan of!).

We will just have to see what the future holds and just hope that at least it stays at its current level – and perhaps get even more modellers and even better kits...

James Harris
via email

Get the name right!

Dear Neil,

The articles in MAM on real aircraft are a nice addition to the modelling related stuff. Although many aviation magazines have articles on the same aircraft, those articles are not aimed at the modeller in the same way and do not provide information that is useful to the modeller.

I had the pleasure of helping Des Brennan with information on Norwegian P-3C Orion aircraft for the January 2008 issue. There was however one piece of information that needs to be corrected. The text states that the local name of the service is Kongelige Norske Luftforsvaret, (meaning Royal Norwegian Air Defense). This is not technically correct. The name is simply Luftforsvaret. When used in English text, the service should be named Royal Norwegian Air Force, abbreviated RNoAF.

This fault is frequently found in



foreign texts about Norwegian military aviation. When writing articles most authors just copy the names that other authors have used, without checking out themselves what is correct.

The C-130H Hercules transports are frequently visiting foreign airfields and are thus carrying the English version of the service name. The Sea King SAR helicopters are operating within the country's borders and have the name in the local tongue.

Nils Mathisrud
Norway



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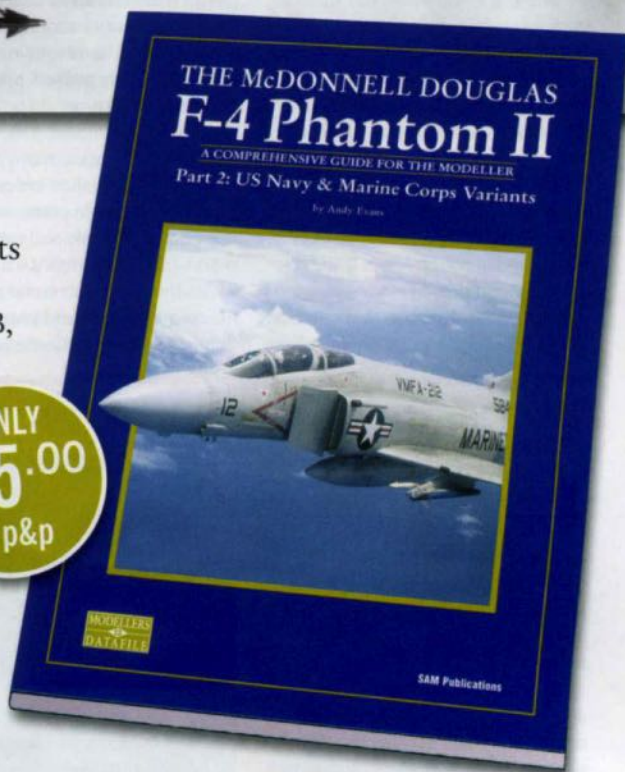
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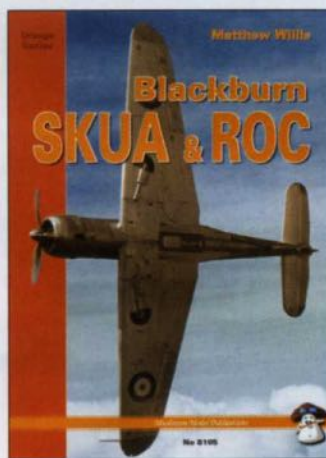
This book was announced quite a while ago but it has finally arrived – just in time for the IPMS(UK) Scale Modelworld show last November – and it was most definitely worth the wait!

Without a doubt this has to be the most comprehensive one stop reference book for the Skua and Roc yet printed, and anybody considering building the recently released 1/48 scale Special Hobby Skua and Roc kits, (as I have just done), just HAS to buy this title in order to get the most out of their models!

However, it is much more than just a modelling reference as it contains enough previously unseen and unrecorded material, such as photos, information and stories, to keep the

most informed aviation enthusiast fully engrossed, and the almost constant referral to people who actually worked with the aircraft, gives the text an added human touch that is all too often missing from books of this nature – after all an aircraft is just a machine which cannot really do much without human involvement and this book is packed with stories of human endeavour.

The book contains 136 photos within its 160 pages, many that have never been published before, as well as numerous scale plans, camouflage pattern details and period diagrams from maintenance manuals, whilst there are also some excellent full colour walkaround photos taken during 1940 of a Skua that crashed in



by Matthew Willis
ISBN 9788389450449
Mushroom Model Publications
UK price £13.00
230 x 165mm, Softback, 160pp

Norway, as well as more modern photos of the Skua wreckage held at the Fleet Air Arm Museum at Yeovilton and a reconstructed Skua cockpit residing at Bodo in Norway.

There are seventeen pages of fantastic artwork comprising of thirty-three colour side views by Kjetil Akra round off this excellent package, which can be 'Highly Recommended' to anybody interested in either British World War Two aircraft, naval aircraft in general, or those who just like something out of the ordinary.

This has got to be one of the best Mushroom Model Publications books yet released to date.

Tony O'Toole

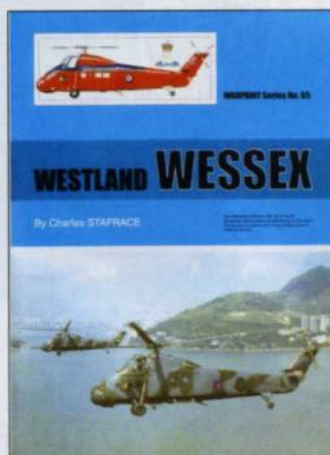
Thanks to Mushroom Model Publications for the review sample.

Warpaint 65: Westland Wessex

This is another 'large size' profile from the Warpaint stable and it needs to be. Used by some twenty-five RAF squadrons and other units, plus at least eighteen Naval units, it made the Wessex the mainstay of Britain's helicopter force for many years.

The number of pages allows the author to give a reasonably lengthy operational history of the aircraft in its various guises. This text is supported with a number of useful tables which include a production list, user squadrons and units, specifications and a kit and accessory list.

As I have said many times before, this series is, in the main, designed for the modeller who wants a little more than the odd colour scheme, and he/she certainly gets it here. The book is profusely illustrated in b&w with some colour shots. There are 1/72



by Charles Stafrace
Warpaint Books Ltd
UK £13.50
298 x 210mm, Softback, 60pp

scale drawings, a couple of pages of close-up shots and no less than forty-five colour profiles in a multitude of colour schemes.

Space will only allow me to mention a few, but here goes – an HAS.1 in RAF Blue Grey, another in Light Stone, an HAS.3 from HMS Antrim, Falklands 1982, again in RAF Blue Grey, an overall Yellow HAR.2 of 22 Squadron, RAF St Mawgan. There are RAF machines with Dark Sea Grey and Dark Green camouflaged upper surfaces, with some in winter schemes, an HC.2 based at Kia Tak, an HCC.4 of the Queens Flight, and a machine based at Culdrose painted maroon overall. That is just a snippet of the British aircraft, but if you want

the more exotic schemes, there are profiles of machines from Brunei, Ghana, Iraq, Oman or Uruguay which might be more to your taste.

This is an excellent addition to any aircraft modeller's/aviation enthusiast's library but I must point out that according to one reader who supplied some of the photographs, there are a few caption errors. They are as follows – the third profile down on p9 should read Sek Kong and not Kai Tak and on p16 the fourth profile down should read 1969 not 1959. Photo caption errors include – on p40 a 28 Sqn Wessex which should read '16 September' and not 'late 1980s'; on p41 HC.2 XL728, the actual date supplied was 1 September 1972; p52 Omani Wessex, whose actual date was 22 May 1974 at Seeb; p53, wrong scheme, it should be green overall and wrong serial it should be XT457, and the location was Biggin Hill, 1966. On the back cover the date for the civilian aircraft should be 1991 and not 1961.

Such caption errors are the bane of an editor's life, sometimes mistakes are made by just a keystroke on the computer, as I know from personal experience! I am indebted to Adrian Balch for the caption error information and it is good to get such 'immediate' corrections from someone who is obviously a Wessex fan, but I am sure that for most people it will not reduce the overall enjoyment of this profile.

Ernie Lee

Thanks to Warpaint Books Ltd for the review sample.



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DVD: Air War Over Finland 1939 – 1945

During the years 1939-1941, Finland was engaged in the Winter War and the Continuation War against the Soviet Union. The Finnish Air Force had to fight against a massively superior force from the very outset of the Winter War on the 30th November 1939. In the first two days of that war more than 10 enemy aircraft were shot down. In spite of the opponent's overwhelming superiority of numbers the Finnish Air Force managed to achieve many victories.

This DVD mainly consists of film footage shot by wartime photographers of operations undertaken by the Finnish Air Force in the Winter and Continuation Wars. A significant part of this material has never been published before.



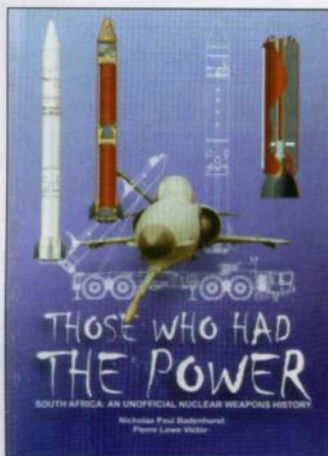
Those who had the Power

This is an unusual book, and is in fact somewhat controversial as it purports to tell the real story behind South Africa's nuclear weapons and other weapons of mass destruction.

The introduction covers the official version of events and includes a brief history of South Africa since 1902. Although the South Africans had abundant deposits of Uranium, technology was needed from overseas, with both France and Israel being mentioned. The reasons why they needed such weapons is fully explained, as indeed is another devastating munition – the fuel air device.

This book is quite a tome, which covers a lot of ground and is a story that only a student of South African modern military history would otherwise know anything about. All the delivery and potential delivery vehicles are described and illustrated. Some of these will not be of particular interest to aviation enthusiasts but many well-known aircraft would have been used and these are covered amongst the large number of illustrations.

Some of these aircraft you might



by Nicholas Paul Badenhorst & Pierre Lowe Victor
ISBN 1-920010-63-7
AVA Systems (Pty) Ltd
UK Price TBA
240 x 178mm, Softback, 366pp

find surprising. As well as machines you might expect, such as the Buccaneer and the Mirage III, it was envisaged that the Boeing 707 could carry two wing mounted weapons!

This is a book I could really only recommend to the serious aviation enthusiast, but it certainly opens a hidden door on nuclear history.

Ernie Lee

Thanks to AVA Systems (Pty) Ltd for the review sample.



Topcolors 3: Fighters over Japan – Pt 1

An excellent concept book from our friends in Poland, which features the colour schemes and markings of four Japanese Homeland Defence fighter types, ie Ki-61, Ki-46-III, Ki-44 and Ki-84, covering twelve individual aircraft in profile and plan views, matched against eleven USAF P-47Ns and P-51Ds, again in a mix of profile and plan views.

A short three-page introductory text is written in English and the profile/4-view captions are in English and Polish, but it is the superb artwork by Janusz Swiatlon that makes the book so 'modeller-friendly' and inspirational.

The icing on the cake is the 260 x 180mm decal sheet which is included, comprising the illustrated aircrafts' serial numbers, codes and nose art and markings, in 1/72, 1/48 and 1/32 scales.

I don't know the release date for Part



by Tomasz Szlagor, Janusz Swiatlon and Leszek A Wieliccko
ISBN 978-83-60445-78-5
Kagero
UK price £13.00
275 x 205mm, Softback 40pp



Two, but this Part has already rekindled my interest in the War in the Pacific, so I shall certainly be looking out for it...

Recommended.

Neil Robinson

Thanks to Kagero for the review sample.



Kursk – The Air Battle: July 1943

This is the third book in the ongoing series of Ian Allan's excellent air campaigns which, arguably in this case, covers the pivotal battle of the Second World War in Europe. This is no overview but a very detailed account of air operations by both the Luftwaffe and the Soviet Union's VVS. As with other books in the series, the air operations are interwoven with the ground actions making it possible for the reader to follow the whole battle.

The first chapter covers operations from Stalingrad to Kursk with a map illustrating the deployment of troops before the battle. Preparatory air operations are described next, with both combatants attacking installations at the rear of their battle lines.

This was to be a battle of gigantic proportions. For instance the Germans had something over half a million troops, with the Soviets having 20,000 more. When it came to armour, the Germans fielded 3,700 tanks and SPGs with over 2,300 on the Soviet side. But when it came to aircraft the Luftwaffe had at its dis-



by Christer Bergstrom
ISBN 978-1-903223-88-8
Ian Allan Publishing Ltd
UK price £27.99
303 x 227mm, Hardback, 144pp

posal 2,300 machines and the VVS some 3,000.

However numbers was not the only issue – more important was the quality of the aircraft and the pilots. The Soviet Air Force at that time was equipped with, in the main, the Yak-1, Yak-7B and the La-5, aircraft on a par with the Bf 109E and F, but

by this time the Luftwaffe was equipped with the Bf 109G-4 and G-6 and also the Fw 190A, all of which were superior to the Soviet types.

However, there was one Soviet aircraft that was on a par with the Luftwaffe aircraft, the La-5FN, but it was only available in small numbers at the time. The other problem was aircrew training and experience. The Soviets had lost 14,700 aircraft in 1942 along with many aircrews. At this time, VVS pilots were sent into action with as little as eighteen flying hours, whereas the Luftwaffe, even though it had scaled back training, at least sent pilots into action with seventy flying hours. To make matters worse for the VVS, the Luftwaffe had a large core of veterans in its ranks.

Having described the protagonists, the book goes on to tell the story, in minute detail, of the battle to end all battles. Soviet losses were appalling, but their sacrifice was the turning point in World War Two.

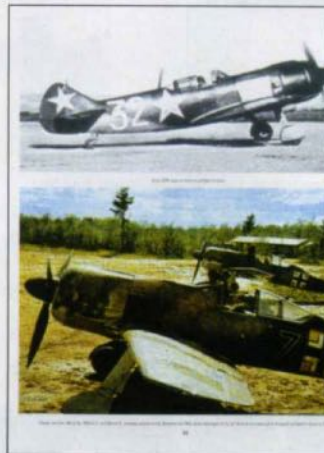
The book also includes a number of interesting appendices, with such things as 'Order of Battle' detail lists of units and losses, and

of course there are a large number of b&w photographs

This is not specifically a modeller's book, but it does tell the stories behind the models you may wish to make, and as such, to both the modeller and the student of aviation history, it is highly recommended.

Ernie Lee

Thanks to Ian Allan Publishing for the review sample.



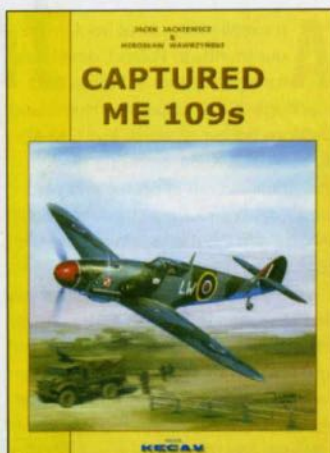
Captured Me 109s

This Polish publication written throughout in English, nearly slipped 'under my radar' and had it not been brought to my attention by my colleague and fellow editor, Gary Hatcher, I might have missed it – and that would have been a shame as it is a cracking book!

The rather uninspiring and easily dismissable title, belies a fascinating feast of wartime photos and accompanying full colour illustrations!

Within its 176 crammed pages, the book chronicles the colour schemes and markings of scores of Messerschmitt Bf 109s, from the first Bf 109Bs to the last Bf 109Ks, that were either shot down, crash-landed, abandoned or captured, for which the operational history and the aircraft's subsequent fate can be related.

From the Spanish Civil War, through the Battles of France and Britain, Channel Coast operations, the North African, Mediterranean and Eastern Fronts and finally the Defence



by Jacek Jackiewicz and Mirosław Wawrzynski
ISBN 978-83-924914-0-8
Atelier Keczay
UK price £35.00
295 x 210mm, Softback, 176pp

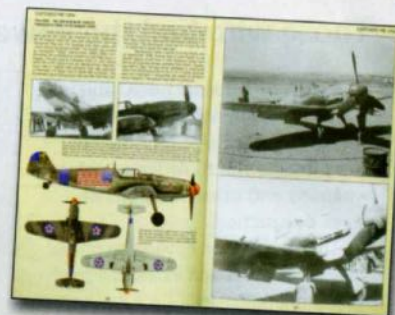
of Germany, the authors and artist have compiled a compendium of colour scheme and markings details,

with full colour illustrations and accompanying b&w wartime photos, of what each individual aircraft looked like whilst under its original Luftwaffe ownership and then, where applicable, under its new operators.

There is good coverage of many Battle of Britain Bf 109E 'victims' and slightly later Bf 109Fs and Gs that found themselves in the UK for one reason or another. Another large section of the book is understandably taken up with the North African and Mediterranean Theatres, where, due to the ebb and flow nature of the land battles, many aircraft had to be abandoned, and several were put back in to flying condition again.

There are examples of French, British, American, South African, Swedish and Russian captured '109s, plus Italian, Swiss, Croatian and Slovakian operated machines.

What I particularly like about this book is that the subject aircraft's



'original' scheme is illustrated, as well as what it looked like after it was 'captured', allowing the modeller to produce a replica of the aircraft in question, both 'before' and 'after'!

An ideal book for both the modeller and aircraft enthusiast – it is of interest to both camps – and unreservedly recommended for anyone with an interest in Bf 109s in particular or World War Two in general. I shall certainly be modelling from it in the future...

Neil Robinson

Thanks to Atelier Keczay for the review sample.

Ali D'Italia 25: Fiat BR.20M

We have almost come to depend on this Ali D'Italia range of books for our coverage of the aircraft operated by the wartime Regia Aeronautica – and long may they continue!

Published in their usual style with thick card covers, which gate-fold out to provide room for the colour scheme and markings artwork, in this instance featuring nine machines – one as a 5-view – in full colour, and an A4 illustration of the cockpit plus a page of wartime colour photos!

Written in dual Italian-English in arallel columns on each page, the text, by the well-respected Regia Aeronautica historian Paolo Waldis,



by Paolo Waldis
ISBN 978-83-7237-185-0
La Bancarella Aeronautica – Torino
UK price €16.00
295 x 210mm, Softback, 60pp

There are 4pp of 1/72 scale plans, which made me think it is about time that this machine could do with being covered in state-of-the-art kit form, to maybe replace the old 1/72 scale Italeri offering, but especially nice would be one in 1/48 scale – hint, hint!

As with all the Ali D'Italia range of books, this is highly recommended for modellers and aviation enthusiasts alike.

Neil Robinson

Thanks to La Bancarella Aeronautica for the review sample.

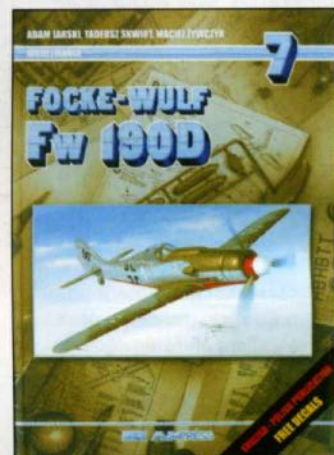
Modelmania 7: Focke-Wulf Fw 190D

It seems as if the Fw 190D is attracting quite a bit of attention bookwise recently. This English-Polish language publication is the seventh in the Modelmania range, following the recently published Mitsubishi A6M5 Zero and NA P-51D Mustang.

The book mainly chronicles the differences between the various Fw 190D sub-types, rather than offering a detailed operational history, although there is a section covering operations. There are 18pp of scale plans to 1/48 scale and a large section of the book is given over to what appear to be Focke Wulf 'Works Diagrams' accompanied, where relevant, with detail photos of both b&w wartime and colour restored airframe sections.

There are 26pp of full colour camouflage and markings profiles, some of which have upper/under surface views, with one particularly useful section illustrating where all the stencils go, for which there is a free 180 x 130mm decal sheet provided, with the aforementioned stencils in 1/24, 1/32, 1/48 and 1/72 scales.

At the end of the book there is a 21pp section on building the Trumpeter 1/24 scale Dora 9, finished off with a comprehensive list of literally ALL the Fw 190D kits that have been produced, in all the scales, plus resin and photo-etched accessories



by Adam Jarski, Tadeusz Skwiot and Maciej Zywczyk
ISBN 978-83-7237-185-0
A J Press
UK price £15.95
290 x 200mm, Softback 132pp

and decal sheets.

You may probably think you

have got everything you need on the Fw 190D by now, but this softback is closer look, and when you do, I bet you can't resist it...! Recommended.

Neil Robinson

Thanks to the Aviation Book Centre for the review sample.



describes the development history and subsequent operational use of the Fiat BR.20M sub-type, including a large and detailed section on the Regia Aeronautica's Corpo Aero Italiano's (CAI) disastrous operations over the UK in October/November 1940, and then on to operations over Malta and North Africa, finishing up with the type's 'swansong' over its homeland in 1942/43.



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